

THE BOOK
of
KNOWLEDGE

The BOOK *of* KNOWLEDGE

The Children's Encyclopedia

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DEPARTMENTS

The Earth	The United States
Stories and Legends	Familiar Things
All Countries	Our Own Life
Golden Deeds	The Fine Arts
Helps to Learning	Men and Women
Literature	Poetry and Rhymes
Animal Life	Plant Life
Famous Books	Things to Make
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Book of Wonder	

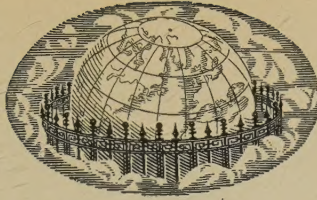
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CONTENTS OF THIS VOLUME

This is a short guide to the principal contents of this volume. It is not possible to give all of the questions in The Book of Wonder, or the titles of all of the Little Verses and Problems, but in all cases the pages are given where such sections of the book begin. In the big Index, Volume 20, you will find every title and every subject, including the pictures.

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A cotton-field near Shelby, North Carolina; negro laborers picking the staple.

THE SOUTHERN STATES

PART I.

ONCE a painter made a picture supposed to be symbolic of the South. It showed a big tree, a negro asleep under it, and cotton-fields stretching away to the background. Most Southern people would object to that picture because it tells too little. It is true that the South has great forests, it has within its borders nearly ten million negroes, and it produces over half of the world's cotton; but it is vastly more than all that. This article may tell you some things about the South that you do not know.

When politicians ask, "How will the South vote?" they have only the people in mind. We may say, "The South is a good place for dairying," meaning only the region. But when we say, as we may, "The South is making wonderful progress," we mean the Southern people in the use of their resources. That is the way that will be followed in this article.

If we were asked who are the people of the South, it would be easy to say, "Those who live in the Southern states" if all could agree as to just which states should be named. Some writers include as many as sixteen, others only thirteen. These are the thirteen that



are always included: Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas, Tennessee and Kentucky. Maryland, West Virginia and Missouri are often included. In this study we shall consider the thirteen named and West Virginia. These include together a little less than 30 per cent of the area of the United States and almost exactly 30 per cent of the population.

The South contains the oldest Spanish settlement in the present United States, St. Augustine, Florida (1565), and the oldest English settlement, Jamestown, Virginia (1607). Four of the states were among the original thirteen: Virginia, which then included Kentucky and West Virginia; North Carolina, which included Tennessee; South Carolina; and Georgia, which claimed some of what we now call Alabama and Mississippi. So a part of the South is old as we count age. The remainder of the South was gained from France, Spain and Mexico after the Revolution.

The people of the older South were chiefly English, though there were Germans, Irish, Scotch, Welsh, and

French Protestants (Huguenots). When the newer South was added to the United States many people of Spanish, French and Mexican blood came with the land, but the region soon received large immigration from the older states, and this was soon in the majority. However, French influence is still strong in Louisiana, and Spanish-Mexican in Texas.

The section has received little immigration from across the ocean since the Revolution. Texas has the largest percentage of foreign-born, but this is less than 8 and includes many Mexicans. Seven of the states have less than one per cent foreign-born. Negroes form something less than three-tenths of the population in the section as a whole. The percentage runs from less than 6 in West Virginia to more than 50 in South Carolina and Mississippi. However, so many negroes are moving to the North and West that it is probable that 1930 will show a white majority in both states. So you see that most of the Southern people are "native-born whites," as the Census calls them, and very often several generations of their ancestors lived in the state, or at least in the section where their descendants now live. Generally the Southern people are inspired by a deep love for their section and an almost clanish affection for their relatives and friends.

ARE THERE MANY EVIDENCES OF THE CIVIL WAR LEFT?

Southern people are proud of their military heroes and have erected many monuments in their honor. The greatest of these is now being cut on the side of Stone Mountain, near Atlanta, one of the largest masses of granite in the world. The figures are to be heroic in size, and the monument as a whole will be most imposing.

Aside from memorials, evidences of the Civil War in the South are few.

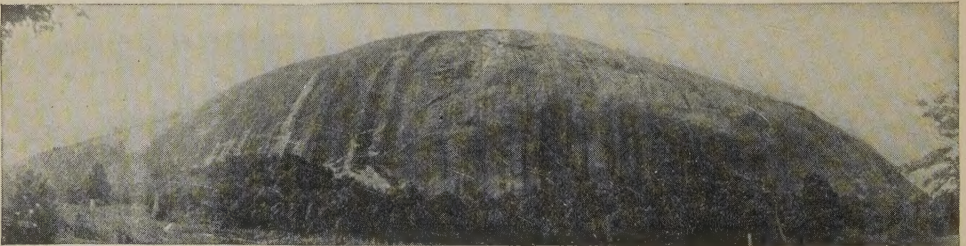
That war was terribly expensive both of life and of property. It interrupted all ordinary business from 1860 to 1865, and for the next fifty years made progress in the South very difficult. Now that the war is over and the days of reconstruction are past, Southern people are facing present tasks and are studying future possibilities. There is no time to harbor grievances, real or imaginary, when there is so much important work to do. That is the way most people of the New South feel about the Civil War.

IS THE SOUTH ONLY ONE BIG REGION?

Instead of being one region, the South consists of at least four large regions that are quite unlike. Each is made up of smaller sections that differ somewhat. It is important to know something of the natural conditions in each of these regions, for such conditions have much to do with the industries that develop there.

A low, almost level Coastal Plain stretches from Maryland into Texas. Nowhere is it more than 500 feet above the sea. Its nearness to the sea is one of its most important characteristics. It is narrowest in Maryland, and widest along the Mississippi River, where it extends 1,000 miles from the Gulf of Mexico to the southern tip of Illinois. Two states, Louisiana and Florida, are wholly within this region, which is called, from its location, the Atlantic-Gulf Coastal Plain.

From the Atlantic part of the Coastal Plain west to the central parts of Tennessee and Kentucky, and south into South Carolina, Georgia and Alabama, is the second region, very different from the first. It is a great mass of wide plateaus, long lines of ridges and mountains, with fertile valleys in between. Mount Mitchell, more than a mile above sea-level (6,711 feet), and the highest mountain in eastern United States, is in this section. Pla-

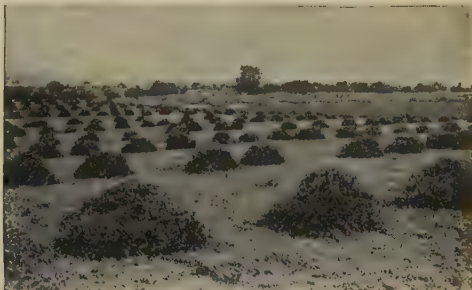
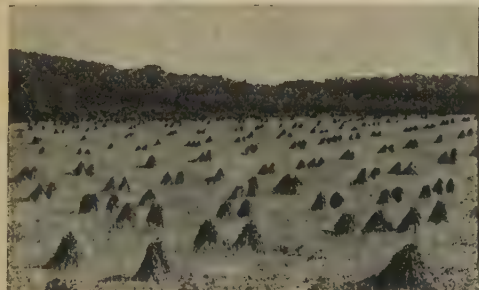


Stone Mountain near Atlanta is an enormous mass of granite which rises abruptly 700 feet above the surrounding country. A series of gigantic figures of Confederate soldiers and leaders is being carved in its rocky side. This is perhaps the most ambitious monumental design ever undertaken.

FROM MOUNTAINS TO SEA IN VIRGINIA

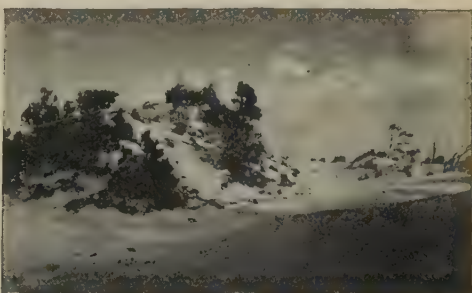
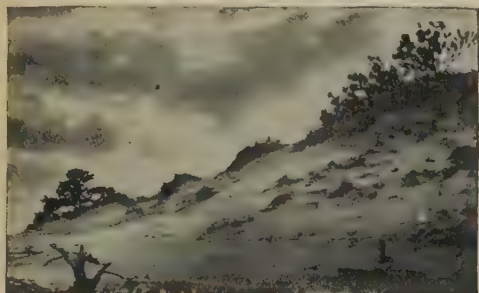


The tourist can find much of interest in the Virginia mountains. Here, looking toward Big Stone Gap, we see railway, highway and stream run side by side in the valley of the Cumberland Mountains.



Photo, United States Forestry Service and Virginia State Chamber of Commerce co-operating.

On the left is a buckwheat-field and on the right clover has been cut for seed.



Near Cape Henry, Virginia, the sand dunes, driven by the wind, shift and often overwhelm trees and other vegetation. This onward march of the sand is quite common along the Atlantic coast.



The mountain region is not all rough. This view near Pattonville, in Scott County in the extreme western part of the state, shows a broad valley with cultivated fields of considerable size, though there is little level land.

Except as otherwise noted, photos by courtesy Virginia State Chamber of Commerce.

teaus, fertile valleys and wooded mountains all taken together make up this region, the Appalachian Highlands. Their main characteristics are elevation and nearness to important markets for their products. Sometimes that part of the region between the Coastal Plain and the mountains is called the Piedmont Plateau.

The third region is much like the second, except that it is west of the Mississippi River, and is not a continuous area as is the Appalachian Highlands. It includes the Ozark Plateau region of southern Missouri and northern Arkansas, the Ouachita Mountains of Oklahoma, and the Central Hilly Section of Texas. It is really a part of the great Appalachian region that has folded down under the Mississippi River, reappearing west of it under other names. It is convenient to call this region Interior Plateaus and Mountains.

The remainder of the South is in some respects the best of all. It, too, consists of several parts somewhat separated from each other. All are interior lowlands—level and fertile, fine for farming. The best-developed are the Blue Grass regions of Kentucky and of Tennessee, the Arkansas Valley, and the Central Basin of Texas. These are parts of the Interior Lowlands. Along the western border of the Interior Lowlands is the Great Plains region. This is found in western Oklahoma and western Texas. Later we shall see how great an advantage the South has in these natural regions and the variety of conditions they represent.

HOW HAS ITS LOCATION AFFECTED THE SOUTH?

The position of the Southern states was favorable for early exploration and settlement. Florida reaches almost into the tropical zone; Texas not quite so far. This position in the southern part of the temperate zone gives to the South as a whole a long growing season and rather mild winters. Its nearness to the Panama Canal gives easy trade relations with western South America and with China and Japan. The long distance of the Gulf Coast from Europe is a disadvantage.

In the South we find fairly good coastlines, temperatures that are seldom very hot or very cold, and rainfall that comes nearly every month of the year, but mainly in the growing season. In such regions one would expect to find the in-

dustries of the open country, such as farming, animal industries, lumbering and mining. Of these, agriculture is the most important.

AGRICULTURE IS THE LEADING INDUSTRY OF THE SOUTH

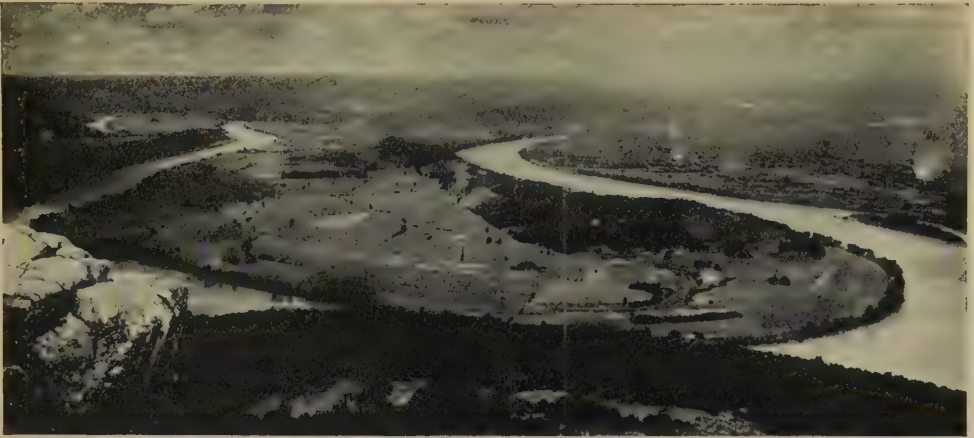
Farming is the main interest for most Southern people. The South probably could lead either the Northeastern section, the North Central area or the West in farming or animal industries. That it does not do so at present is partly because it has not been forced to do so. While some other parts of our country are pretty well filled up, there is still an abundance of room in the South, and it is still comparatively easy to make a living. That means that in the South as a whole competition is not very strong, and one can get along very well by using only half his powers.

As population increases, changes will come about. The land will cost more per acre, and it will be made to produce more. Southern people will farm more and more efficiently. Wealth will increase. Better country communities and better cities will be built, with better transportation lines connecting them.

Nature gave the South a favorable climate, good soil, much underground water, and a great deal of nearly level land. It is well to consider climate first because that is something that everybody has to take as he finds it. The weather in the South is generally fine to medium, seldom really bad. Frequent changes in the winter months are stimulating to man; rains and freezes are good for the next summer's crops. The summer is a long growing season, usually about seven months from the last frost of spring to the first frost of autumn. The summer temperatures do not run as high in the South as in many sections farther from the sea, but there is, however, little relief from heat during the summer months. Most of the rain comes in the summer, when the growing crops need it most. Nowhere in the South, except along the far-western border in the Great Plains region, is there less than an average of 20 inches of rain a year, and that is enough for ordinary crops. The average is about 40 inches.

Of course, a climate that is good for crops is also the kind that crop enemies like. Such pests as boll-weevil and San José scale thrive naturally in the warm, moist air. In his efforts to control crop

TENNESSEE, WEST VIRGINIA AND KENTUCKY



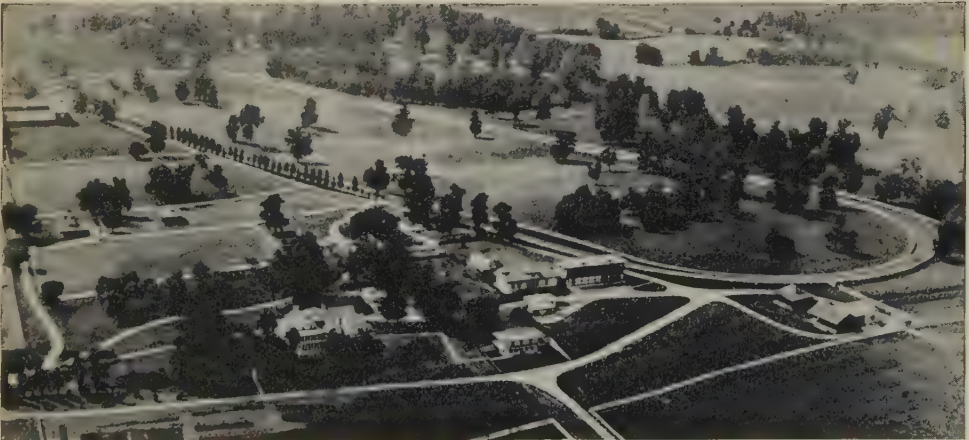
South of Chattanooga the Tennessee River forms a horseshoe known as Moccasin Bend. This view is from Lookout Mountain, where the Battle above the Clouds was fought. In the right background you see the smoke of the city.

Photo, courtesy Tennessee Electric Power Company.



Photo, courtesy Baltimore & Ohio Railroad.

The little village of Harper's Ferry, now in West Virginia, is famous as the scene of the John Brown Raid described on page 2430. It is situated where the Shenandoah and Potomac rivers come together.



The Blue Grass region of Kentucky is famous for the breeding of fast horses. This is Idle Hour, a famous breeding-farm situated near Lexington. Note the private race-track for training in the background.

pests the Southern farmer is being forced into the use of the best farming methods, and to that extent the pests are indirectly doing a service to the South.

HOW DOES THE SOIL OF THE SOUTH HELP?

Unlike climate, soil can be controlled by man. If it is too wet, it can be drained. Much land in southeastern Missouri, in Florida, in Louisiana, and in other parts of the Coastal Plain has thus been reclaimed. If it is too poor, as on the sandy parts of the Coastal Plain, it can be fertilized. Soils of the truck areas and much soil used in cotton-growing is being fertilized. If it washes badly, it can be drained, then plowed along the curves instead of up and down. If the soil does not suit one crop, the farmer can plant another. He can use for truck the sands that warm up early in the spring, and leave the black waxy land for cotton and other crops.

The rich river bottoms never need replenishing by man; the limy soils sometimes need renewing; and the sandy soils must be heavily fertilized to yield good returns. Fortunately, the South has at Muscle Shoals, Alabama, a great power plant that may be used to make fertilizer material for the Southern farmer. The water power there is converted into electricity, which may be used to force the nitrogen of the air to combine with oxygen. The nitric oxid thus formed is then combined with limestone rock and the result is a commercial fertilizer. Besides, the South has much rock phosphate in Florida, Tennessee and South Carolina.

Three sections of the South have the highest fertility. They are the Black Belt of Alabama, the Black Prairie in Texas, and the Yazoo Delta Region in Mississippi. The first two are on limestone soils, once under the sea; the third is very rich soil, renewed often by silt from the rivers. Other fertile regions are the long limestone valleys of the Appalachian Highlands and the Blue Grass regions of Kentucky and Tennessee. The rest of the South has soils that are well

suited to selected crops, and when fertilized, yield heavily. If irrigation be needed for special crops, such as rice, or in special places, such as the lower Rio Grande Valley, enough water is available.

The four large natural regions of the South include plains, plateaus and mountains, thus giving considerable variety in elevation. Of these three types, the plains are the most extensive.

The total width of the plain, one thousand miles from

north to south, insures a good deal of variation in temperature; therefore a great many different kinds of products can be raised. Differences in elevation in the South as a whole have the effect of making it seem larger than it is, for on the highlands many cool-summer products, such as apples, can be grown. You will see that it is possible in the South to raise some tropical-zone products, such as bananas; all subtropical-zone products, like cotton, citrus fruits and figs; and practically all temperate-zone products. A list of everything raised in the South for market would be too long to give.



The cotton plant belongs to the same family as the hollyhock, and the flowers are not unlike. When the flower drops off a "square" is left which develops into a boll tightly packed with fibres which cling to the seeds.

SOME OTHER SOUTHERN CROPS



For many years hemp was a leading crop in Kentucky, and much is still grown in spite of the competition of European hemp and of other fibres. For some uses hemp is better than any other common fibre.



Kafir corn belongs to the Sorghum Family, but the juice is not sweet. It was introduced into the Southern states from the Far East and is an excellent forage plant in semi-arid regions. This field is in Texas. In Virginia growing early vegetables for northern markets is an important industry. At the right is a field of cabbages.

Cabbage-field by United States Forestry Service and Virginia State Chamber of Commerce co-operating.

IS THE SOUTH STILL A ONE-CROP SECTION?

Once the South could have been accused of "carrying all its eggs in one basket," that is, raising cotton or tobacco and neglecting other crops, but that is hardly true to-day. The South supplies more than one-half of the world's cotton, it is true, but only about one-third of her acres are planted to that crop, and the value of cotton and cotton-seed taken together is only one-third of the total crop value. The South is raising many important crops, and much of the total amount of each in the United States comes from the South. For example, over 85 per cent of the tobacco is grown in the South. Besides these products, there are dozens of others. Some regions have become widely known in connection with certain crops. For instance, Georgia and North Carolina are famous for peaches; Florida and the lower Rio Grande Valley, for citrus fruit; Virginia, for apples; and many sections on the South Atlantic and Gulf coasts, for early vegetables. It is plain that the South is not merely the "land of cotton."

CAN THE SOUTH IMPROVE HER AGRICULTURAL SITUATION?

Those who know most about agriculture in the South say that cotton should remain an important crop, but not the only one. Although Cuba is our permanent rival in the growing of sugar-cane, the South could increase her sugar-cane acreage. The South should grow all its own corn. The peanut, from which have come more than 150 food products, should be further developed. The delicious pecan could be more extensively cultivated. There should be more fruit farms, truck farms, poultry farms and dairy farms to take the place of the old one-crop farms. As has been well said, "one-crop farming is really not farming so much as it is soil-mining."

Most of these things are becoming established. Some of them are not at all new. Away back in 1894 the South sent many carloads of corn from Southern fields to help Nebraska and the Dakotas when drought caused crop failures there. The farm boys and girls are doing wonderful things. Co-operation in buying and selling are well established in many places. The development of the fertilizer business is important in the section, and better farming is being done.

THE IMPORTANCE OF ANIMAL INDUSTRY IN THE SOUTH TO-DAY

Beef cattle have long been important in this section. There are more cattle in the South than in the West. Now the dairy cow is traveling southward, and the "dairy dollar" is said to be wiping out poverty in the plains and illiteracy in the mountain sections. Begun as a side line with cotton-growing, on many farms dairying is now bringing in more money than the farm crops. The South has nearly a third of all the dairy cattle of the United States, and produces a large part of the butter.

Animal industries are favored in the South because of good all-year grazing with plenty of water, and because expensive housing in winter is not required. Two main problems are before the owners: to keep the cattle tick-free and to protect them against sudden cold snaps in winter. The states impose dipping regulations to kill the ticks, but the housing is left to the farmer or cattleman to take care of. The South has the finest of cattle feed in cotton-seed meal and cake and in the meals and fodder from peanuts, velvet beans, soya beans and cow peas. It has also alfalfa, Kafir corn and other fodders. In time the South will be recognized as a section naturally favorable for dairying on a commercial scale. The development of cities is helping to bring this about.

THE LUMBER INDUSTRY COULD BE PERMANENT IN THE SOUTH

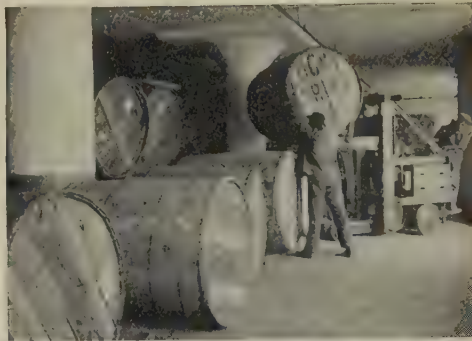
The South has the largest amount of standing timber to be found anywhere. It consists mainly of pine and hardwoods. To develop its lumber industry properly is important. We have seen that to grow cotton year after year on the same land takes out the fertility without replacing it. To use the forest resources without replacing them is just as wasteful. Some day we shall be cultivating our forests as we cultivate other important crops.

There is no region more favored than the South for the lumber industries. Natural reforestation takes place more quickly than in the North or West. The workers can get the trees out easily. Mountain lands are available for permanent forest reserves. Water power in the South is available for manufacturing lumber into other products. To-day the products of Southern forests are sent all over the world, and the by-products are becoming more and more valuable.

THE TWO GREAT MONEY CROPS



In North Carolina sometimes cotton-field and cotton-mill are close together. However, the state uses much more cotton than it produces, bringing many bales from states farther south. Photo, Ewing Galloway.



Tobacco growing in Kentucky. When ripe the tobacco is cut and dried slowly in barns. Then it is packed in hogsheads and stored for months in order that the flavor may improve. At the right is a scene in Winston-Salem, North Carolina, which leads the world in tobacco manufacture. Photo, Ewing Galloway.



Photo, courtesy North Carolina State College.

Gathering bright tobacco in central North Carolina. The entire stalk is cut and put into the barn to cure.

MINING IS ANOTHER INDUSTRY OF THE OPEN COUNTRY.

Nature gave to the South not only rich soil at the surface, but many valuable minerals underneath. Of the fifty-seven important minerals of the United States the South has all except borax and platinum. Nine minerals found in the South are not found elsewhere in the United States. They are phosphate, sulphur, bauxite, fuller's earth, mica, tin, barite, pyrite and manganese. The world's largest zinc field, most of the world's bauxite (from which comes aluminum), and a third of the world's petroleum are in the South.

COAL AND IRON-ORE IN THE SOUTH

The coal of the South is important, compared with that of the United States, France, the British Isles and all Europe. It is said that there is more coal in the South than in all Europe except Russia. Most of it is bituminous coal of good grade. West Virginia is second only to Pennsylvania in production. Much coking coal needed in the making of steel is found in the Birmingham district. Lignite, a poorer grade, is abundant and may in time prove highly valuable. Coal is used not only as a fuel, but as a source of many valuable by-products. Coal and iron are far more important in the business world to-day than are the so-called precious stones. The South has much iron-ore of good grade, as well as much coal. Iron is greatly affected by lime, which has the peculiar property of making the iron separate out from other materials with which it is usually found. This fact helps one to understand why iron deposits are often found where a mountainous region grades into a limestone plain. This iron is found in the Southern Appalachians where the lower slopes touch the limestone valleys. The chief centres for iron-and-steel products are Birmingham, Alabama, and Chattanooga, Tennessee. Birmingham has unusual advantages for becoming a centre of the iron-and-steel industries. Found within a few miles of one another are the three essentials in making steel—iron of good quality, limestone to separate it out, and coking coal for fuel. The region is not far from the coast with water transportation for the heavy products to all parts of the world. It seems that production is likely to increase greatly.

ALUMINUM, SULPHUR, PETROLEUM AND OTHER MINERALS

Probably next in importance to coal and iron is aluminum. It is a very light, strong, durable metal, important in business, from the making of kitchen utensils to the strengthening of airplanes. The United States leads in the production of aluminum, and the South supplies all the bauxite from which it is made. The aluminum is obtained by the use of much electric power; then the crude aluminum is manufactured into the many useful articles that trade demands. A town in Arkansas is named Bauxite. Bauxite is obtained also from Georgia, Alabama and Tennessee.

A financial panic struck the island of Sicily when her best customer, the United States, began securing her sulphur from Louisiana and Texas. These two states now supply all the sulphur needed in this country—for matches, sulphuric acid, vulcanizing rubber, and for many other purposes—and besides produce some for export. Sulphur is one of the most important minerals of the South.

Petroleum, or rock oil, is a very spectacular material to-day, for one who brings in an oil well comes suddenly into great wealth. Of this mineral the South has one-third of the world's known supply. The three states of Oklahoma, Texas and Louisiana produce the greater part. Petroleum is used mainly as a fuel, but it is being used more and more as a lubricant and for its valuable by-products. Often associated with petroleum is natural gas. These products are responsible for much of the wealth that is in the South to-day, and for much of the high rank in manufacturing. The refining of petroleum is an important manufacturing industry itself, and the refined petroleum supplies power for other types of manufacturing. All of this development has come within a few years. In fact, the rapid growth makes it difficult to write truthfully of Southern conditions.

Besides such highly valuable minerals as these, the South has great quantities of building-stones, including granite and marble, road-making materials, glass sands, materials for making Portland cement, and many other such products. The mineral wealth of the South is already important, but greater developments are expected to come in the future.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 4881.

IN THE LAND OF THE PALMS



The waterfront in Jacksonville, Florida. This city is situated on the St. Johns River, fourteen miles from the ocean, and the water is deep enough for large vessels. © Woodward Studio.



Photo, Ewing Galloway.

Miami, Florida, is one of the most rapidly growing cities in the Union. Here we see the busy new waterfront, most of which is "made land." This means that the land has been pushed out into the water.

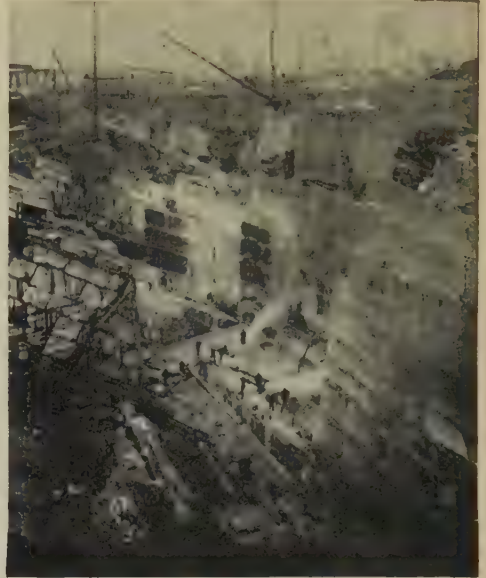


The palms growing on the Alamo Plaza, San Antonio, Texas. Photo, Patteson.



A residence street along the waterfront in Miami, Florida. Photo, Fishbaugh.

SOUTHERN GRANITE AND MARBLE



Several Southern states produce large quantities of granite and marble. On the left is a granite quarry in South Carolina which produces much stone of excellent quality for roads, buildings and monuments. To the right is a large marble quarry in Alabama which has been worked for years.



Tennessee is second to Vermont in the production of marble, and furnishes much beautiful stone of high quality and of many colors. The supply in eastern Tennessee seems to be inexhaustible. Usually a series of holes is drilled, and by means of wedges the great blocks are split off and raised to the surface.

Photos, courtesy Columbia Chamber of Commerce, Alabama Power Company, and Tennessee Electric Power Company.



The chemist at work in a modern laboratory.

CHEMISTRY IN THE WORLD'S LIFE

A PHILOSOPHER of two thousand years ago said that happy was the man who could learn the causes of things; and it is true that one of the greatest gifts of the Creator to mankind is the divine curiosity which seeks to know always how and why things happen in the universe around us.

Chemistry is the science which, while never satisfied because it can never come to the end of knowledge, unceasingly searches for the secrets of the composition of chemical substances. Many great chemists have toiled at their work with little or no reward except the joy of discovery. Yet, except to such minds as theirs, chemistry would be a dull subject if it told only of how many atoms of oxygen and nitrogen and carbon substances were composed, without showing what use could be made of this knowledge.

There need be no doubt about chemistry's gift in that direction. There is hardly anything we use or anything we wear, and not a great number of the things we eat, which is not indebted to chemistry for the knowledge of how to make it, prepare it or improve it.

Chemistry takes hold of this old earth, wrings its materials out of it, and makes them ready for service. It does this mostly by very intimate

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knowledge of what those materials are made of, down to their last atoms or molecules, as well as the way the molecules can be got to change partners with each other so as to transform one substance into another. Without this exact knowledge chemistry would never get very far, for, when one comes to consider chemical processes, they are usually simple and few in number.

The chemist, for example, dissolves one substance in another, or, as he would say, prepares solutions of them like salt in water, or calcium carbonate—which, when in water, gives it hardness and forms a deposit on our kettles. Or he may precipitate substances from a solution, which is to drive them out of it. Or he may filter them out; or he may distil them out by boiling the solution and the solvent and catching the vapors.

When chemistry comes into play in the things of daily life its operations must be conducted in the easiest and cheapest way. The ease of the operation will depend on the chemist's knowledge of the qualities and behavior of the substances with which he has to deal; the cheapness will follow as he finds the best way of converting these properties and behaviors to its own uses. That is the part the chemist plays in the industries of daily life.

The chemist has the whole earth as raw material. If he began with the rocks he would have abundance of chemicals on which to work, though the chemical elements would be few: calcium in the forms of limestone and chalk and marble; magnesium, which joins with the calcium with the aid of the commonest known acid, that of carbon; and silicon, which, joined with oxygen, becomes sand or quartz, and with the help of water goes into silicates, or, when aluminium comes into the family party, becomes clay. Out of these few elements and their combinations with materials, one of the simplest stuffs that man made was mortar. The chemist took a hand in the middle of the nineteenth century and improved on the mortar so as to make cement as good as that of ancient Rome.

THE USEFUL GAS THE CHEMIST HAS OBTAINED FROM CALCIUM

But this is only the beginning of what the chemist did with calcium. Out of calcium oxid, or quicklime, he has, by heating it with coke and then treating with water, obtained acetylene gas. By adding sulphuric acid to lime he has obtained plaster of Paris. Out of silicon comes silica, and from silica comes glass; and what the chemist has done to glass, which is a very peculiar chemical substance, almost like a petrified liquid, would take a whole volume of *The Book of Knowledge* to tell.

Out of clay, or rather out of the bauxite, found principally in the United States, France and British Guiana, the chemist has driven out the aluminium so cheaply that it is now cheap enough for most housewives to buy; and, in alloys with other metals, has a future which cannot yet be measured.

TAKING NITROGEN FROM THE AIR TO FERTILIZE THE SOIL

The chemist had turned his attention to clay long before aluminium founded an industry. The glazes which waterproof it have been made cheaper and cheaper, and better and better, till there is nobody who does not use chemically prepared clay in the bowl in which he washes, or the cup from which he drinks, every day of his life. But this is no more than a fragment of the fabric of chemical industry which has been built up in every modern country. All countries depend for their prosperity on their agriculture and their manufactures. But the farmer be-

comes more and more dependent on artificial fertilizers which, in the form of nitrates, are made by the chemist.

What is called the nitrogen problem is the problem of taking from the air the nitrogen which it can spare, and fixing it chemically in the form of ammonia and nitrates which will fertilize the soil. The chemist is solving that problem, but he is far from having done it so cheaply and safely that there will always be enough nitrates to make wheat grow as fast and as plentifully as the growing populations of the world want it.

Then there is potash. That is an old story. Every nation wants potash, or potassium salts, of one kind or another, to help to make matches, soft-soaps, glass, or for cotton-printing and wool-washing, or for adding to baking powders. Because the potassium salt deposits were all in Germany caustic potash became relatively scarce and expensive. But these deposits would not have been of much use there if the Dutch chemist Van't Hoff had not found the way to turn them to account.

THE HEAVY CHEMICALS WHICH ALL INDUSTRIES MUST HAVE

At the bottom of the chemical industries the things that are wanted are not many in number. They are called the heavy chemicals and are such substances as nitrates, or the caustic potash just mentioned, or sulphuric and nitric acids. What the chemist strives to do with these is ever to find such improved ways of making them that they will become cheaper. A celebrated chemist has said that unless a powerful stream of sulphuric and nitric acids can be pumped through the arteries of the chemical industries they will stop from heart failure, and with them manufactures will grow feebler and feebler, because there is not one manufacture, from cotton-spinning to that of making steel rails, which does not use chemicals.

After the heavy chemicals—to which we must now add the name of benzol, which comes straight out of coal-tar—are the intermediate chemicals. These require immense factories and staffs of chemists if they are to keep up their cheapness. Benzene and forms of naphthol and phenol are a few of them. These intermediate chemicals the United States and Great Britain had to make for themselves during the World War because

they could no longer obtain them from Germany, and there were built huge factories for this purpose. They served the purpose, but, big as they were in extent, in many cases, they were not large enough in the number of first-class chemists they employed to compete on equal terms with the German chemical strongholds on the Rhine, which, besides making heavy chemicals and intermediate chemicals in the cheapest possible way, employed thousands of trained chemists where the American and English factories employed tens, to convert intermediates into fine chemicals.

American factories now, however, in many fields are able to compete with the Germans. Especially is this the case with the fine chemicals used in dyes. Fine chemicals also figure in medicines of all kinds, including disinfectants, antiseptics, anæsthetics, and perfumes and photographic materials.

THE FINE CHEMICALS WHICH HELP US TO ATTACK DISEASE

Even that does not exhaust the range of the fine chemicals, or the uses to which now and in the future they may be put. Since about 1910 disease has been attacked by fine chemicals in a new way. When the body is attacked by disease, especially when the disease is caused by a parasite, it is often extremely hard to drive the parasite out because the drugs that would harm it would harm the body of man or other animal which the parasite infests. The German chemist Ehrlich invented a way of poisoning one parasite by a chemical which would destroy it but would not injure the animal body. In order to do this hundreds of subtle chemical combinations have to be tried before the right one is found. One of the recent attempts in this way is to poison the parasite which causes sleeping-sickness, and the special chemical found to do this was called Baeyer 145, to denote that the firm of Baeyer had tried 144 chemical combinations before finding the right one.

From these examples it will be seen that the chemist's search for new combinations of chemicals is endless, and the sums spent in finding them are often very large, as in the example of the \$2,500,000 which was spent in discovering the secret of making artificial indigo, though that sum was repaid many times over afterward.

These discoveries are not made by chance. It was patient inquiry which

found that the coal-tar oils—those benzenes, naphthols, phenols—could enter into combinations which made the most powerful medicines, the most brilliant dyes, the loveliest perfumes.

THE MANY VALUABLE PRODUCTS THAT ARE OBTAINED FROM COAL-TAR

From these experiments, and others like them, has sprung a world-wide industry of fine chemicals. Whole volumes are written on the valuable substances which the chemist has drawn out of the black and sticky coal-tar. Let us glance first at the two main classes of them.

The coal is first distilled by heating in ovens where it does not come into contact with the air. From this is obtained illuminating and fuel gas for domestic or industrial purposes, then a watery liquor containing ammonia, then the coal-tar, and then coke. When coal-gas is wanted, the ovens are heated to about 1850° Fahrenheit, and the coal-tar which comes off is rich in benzene and the things to be obtained from benzene. Benzene is the grandparent of the aromatic chemicals, so called because many of them have strong smells. The children of benzene are toluene, phenol, cresol, naphthalene and anthracene; and the grandchildren are an endless array of drugs and dyes. The distillation of the coal-tar affords many useful mixtures of hydrogen and carbon which in many cases are much like animal and vegetable fats and oils.

The eight or nine chief things got from coal-tar—benzene, toluene, xylene, phenol, cresol, naphthalene and anthracene—are treated in various ways by nitric acid, sulphuric acid, chlorine and caustic soda, and from them are obtained some two hundred different compounds which might be called the "second generation" of intermediate chemicals; and from these some nine hundred to a thousand finished dyes are prepared.

A CHEMIST'S GREAT DISCOVERY AND THE REWARD THAT WENT TO OTHERS

We cannot go into all of them; it will be enough to show how the chemists proceed, and we must begin at the beginning with the mauve color first found by Sir William Perkin, a British chemist. It was known even before 1825 in England that benzene treated with nitric acid could be turned into nitrobenzene, which had a pleasant smell and was used as essence of mirbane for scenting soap. When this, in its turn, was acted on by acetic acid and

iron filings it gave up aniline. Perkin was experimenting with aniline when he obtained the first aniline dye which became known as mauve. Perkin was a good chemist but an indifferent manufacturer, and others reaped where he had sown. The next step, taken by the British chemists Medlock and Nicholson, was to make magenta, in much the same way but at less cost, and by treating magenta with other acids the chemists brought out blue. Hofmann, a teacher of chemistry in London, obtained violet, and, more than that, he explained what chemical actions did or did not take place. He went to Germany and stayed there, and German chemists so far explained everything that was taking place in the combinations of hydrogen and carbon molecules in the coal-tar products that the whole range of the colors opened up. These were the earlier coal-tar dyes. They dye silk and wool well, but cotton not so well. As they were apt to fade, however, the chemists took another step.

THE RED DYE USED FOR THE MUMMY CLOTHS OF TUTANKHAMEN

They found that by adding nitrous acid to aniline they got something that would join with some of the compounds such as naphthalene, and make dyes which dye cotton directly and are either fast or slow-fading colors. Such were Bismarck brown, Congo red, various yellows, an orange and a black. Then they began to add and subtract molecules and atoms from another coal-tar product (anthracene), and so they got Turkey red, one of the oldest colors known to man. The mummy cloths of Tutankhamen were dyed with it. Then came basic dyes; and lastly, leaving out some of the intermediate steps, came the dyes which are now made in shades from red to blue and can be washed or exposed to strong sunlight without fading.

But in making each and every one of these dyes the chemist has always had to seek ways of never wasting any of his material, however cheap it may seem; and, if anything is left over, of using it for something else. It was from this unchanging need that the by-products of the chemical factories arose. The first chemical drug (chloroform) was found by Liebig when nitrobenzene was used only for scenting soap. It was fifty years later that antipyrine, the chemical used to reduce the blood temperature in fever,

was made from benzene and aniline. There are several other antiseptics from the same source. Other products are the anæsthetics from coal-tar. Chloroform is no longer obtained from it, but stovaine and alpine are, and these produce local insensibility to pain. They are now less used than a few years ago. Then there was the great discovery by a Japanese chemist, Takamine, of adrenalin, which is now artificially made from the coal-tar products.

THE SWEET SCENTS THE CHEMIST BRINGS FROM THE COAL-PILE

Saccharin and saxin are the sweet substances made from coal-tar; sulphonal and veronal and trional are sleeping drugs; pyrogalllic acid and metol and amidol for the photographer are from the same bounteous spring; and out of it comes nearly everything we like to smell—the various perfumes of the old-fashioned flower gardens, and even the odors of the aromatic spices and the rose.

We have dwelt on this long chapter of the chemist's searchings and findings in the coal-pile because it is one of the fullest in detail and easiest to grasp. But there are other chapters and other volumes which are as great and will never in our day be ended. There is the extraordinary chapter which the chemist calls "catalysis," and which, after having begun as a sort of side-path of research into the causes of things, is now becoming one of the most powerful implements in the chemistry of industry.

THE WONDERFUL CATALYST AND WHAT IT DOES

A catalyst is a substance which acts like the wand of a magician. Suppose we have a tube containing hydrochloric acid and tin. Nothing happens. Drop into it a drop of liquid in which platinum is divided up so finely that it is almost in the state of molecules, and at once hydrogen begins to boil off. The two-hundredth part of a grain will start the action, and at the end the platinum will remain *exactly what it was*. There are numerous catalysts—metals and others, and many living ones, such as yeast.

All are alike in promoting these extraordinary chemical actions among other substances without themselves being altered.

The chemist's patient, tireless search for making new combinations and for dissolving old ones is never at an end.

THE NEXT STORY OF THE EARTH IS ON PAGE 4665.

The Book of Familiar Things



Tank cars to carry oil.

OIL AND WHAT IT CAN DO

OIL is one of the most valuable things known to us, and is as remarkable as it is important. It exists in many different forms. It is composed mainly of hydrogen and carbon, and for short, therefore, we call it a hydrocarbon. The word oil itself comes from the Latin name for olive oil.

There are three sources of oil. It is found in plants, in animals and in the earth. All the oils are important, and fat is such an indispensable part of the bodies of animals that the fatty part of our food needs special care. It is no small matter for a great nation to find enough fatty food for millions of people. During the World War several of the European governments had difficulty in getting enough fat for the peoples. The supplies became so short because of loss of ships, that some of the Allied governments allowed people to buy only a certain quantity. The Germans were even worse off in the war, and suffered terribly through foreign fats being shut out of their country.

Here, however, we are not talking about the many vegetable and animal oils, but the strange oil which in many places oozes out of the ground. Enormous quantities of this kind of oil are obtained by drilling deep holes in the earth.

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This oil from the earth is called petroleum, a word made up of the Latin words for rock (*petra*) and oil (*oleum*). This mineral oil came into great prominence at the end of the nineteenth century. Its importance is still growing, and everywhere in the world search is being made for fresh supplies. Fortunately it is found in many places, but although the quantity existing must be very great, it is small in proportion to the world's need. There is eager competition among the nations to control the great oil-fields. Although not very much oil is found in Britain, British oil companies control a large part of the world's known oil resources. So important is oil in peace and in war for driving motor cars, trucks, tractors and ships, that the British Government itself has taken a big money interest in the Anglo-Persian Oil Company, which controls rich oil-fields in Persia and other countries.

As petroleum reveals itself in many places by oozing from the surface, the ancient peoples of many parts of the world knew it and used it. In the Old Testament we find petroleum referred to as "slime." In Genesis we find the Vale of Siddim described as full of slime pits. The ancient historian Herodotus refers to the oil pits near Babylon, and to the oil spring on the Island

of Zante, which still yields oil, two thousand years after Herodotus wrote. Pliny tells us of the mineral oil of Sicily.

Ancient Chinese and Japanese writers make many references to the subject, and Marco Polo, the great Venetian traveler, tells us of the oil of Baku on the Caspian Sea, where there are now great oil wells.

THE FOUNTAIN OF OIL THAT MARCO POLO SAW ON HIS TRAVELS

He wrote, in his vivid fashion, of "a fountain from which oil springs in great abundance, inasmuch as a hundred ship-loads might be taken from it at one time," and added that, "this oil is not good to use with food, but it is good to burn." He also pointed out that petroleum was then used to cure camels of the mange.

Mineral oil gives off inflammable gas, and this led to the ancient worship of mysterious fires. There were Fire Worshipers at Baku in the old days, and temples were erected at which what was supposed to be Everlasting Fire was visited by pilgrims. Thereabouts, too, petroleum gas was not only worshiped, but was actually made use of to light dwellings and to cook food.

Mineral oil is a rather thick fluid which varies a good deal in color and in composition. Sometimes it is yellow, sometimes green, sometimes almost black. Usually it has a very unpleasant smell. In composition it varies as much as in color, and in this respect it reminds us of coal. Like coal, too, it is found at very different depths in the earth. In some places it is only fifty or a hundred feet deep, while in others we have to drill down for two thousand or even five thousand feet.

HOW PETROLEUM WAS FIRST OBTAINED IN AMERICA

The early explorers of what is now the United States found petroleum oozing out of the ground or floating on the surface of the water, in many places. They found that the Indians rubbed their bodies with it and said that it made them active and quick. So when the country became settled; the whites also began to use it in a small way. Sometimes they laid blankets on the ground where the oil appeared and then wrung it out of them. Sometimes they skimmed it off the surface of the water. The quantity they gained was small. It was then sold by peddlers at a high price, as Seneca Oil, Indian Oil, or some such name. It was rubbed on the

body as a cure for rheumatism, or taken as a medicine. Few families would use more than a pint in a year.

The men boring wells to get salt water in western Virginia in 1806 found much petroleum along with the brine. This caused a great deal of trouble here and at other places, but no one seems to have thought of using it except as a liniment or as a medicine for many years.

THE FIRST APPEARANCE OF THE WORD KEROSENE

In 1846 Dr. Abraham Gesner, of Nova Scotia, obtained an oil from coal which he afterward called "kerosene," from the Greek word meaning "wax," and a company was organized to manufacture it. The company was successful, and other oil-works were established. The demand grew and Dr. Silliman, of Yale College, was employed to find out whether there was any likeness between coal-oil and petroleum. He conducted his experiments on Oil Creek in Pennsylvania and reported that petroleum furnished excellent oil for burning. Samuel M. Kier had sold some oil for burning in 1848 under the name "carbon oil." It sold for a dollar and a half a gallon, and had a horrible odor. Two years later James Young, an Englishman, got some oil which would burn from shale.

People began to want more of this oil, and in 1856 it was determined to make the experiment of boring a well deep into the earth. The company employed Edwin L. Drake to superintend the work. This man had been a railway conductor, who had resigned because of ill health. A new company was organized, and, finally, in 1858, Colonel Drake, as he was called, though he had never been a soldier, arrived in Titusville, Pennsylvania, and tried to begin boring the well. Tools could not be had, and not until May, 1859, did work really commence. A tube was driven down to the rock and the workmen began to drill, accomplishing about three feet a day.

HOW THE FIRST WELL WAS SUNK IN PENNSYLVANIA

Money was scarce, and at one time it was thought that the work must be given up, but Colonel Drake was determined to go on and borrowed the money necessary to keep the drillers at work. On Saturday, August 28, 1859, the drill seemed to move easily just before the workmen stopped for the day. Sunday one of them

visited the well and found that it was nearly full of oil.

A pump was attached on Monday, and the well was found to yield twenty barrels a day. The whole region went wild. Every foot of land along the creek was bought or leased by men who intended to drill for oil. Wells were sunk in every direction. The town grew in a few months from a population of a few hundred to fifteen thousand. Many men grew rich almost at once. The news spread, and men in other sections where oily springs had been found also sunk wells.

THE LAST DAYS OF COLONEL DRAKE SPENT IN POVERTY

The Drake well did not last many years. Gradually the yield grew less and less, and finally gave out altogether. Colonel Drake had thought that it would be permanent and did not try to buy or lease other land. Finally he left the oil regions with \$16,000, which he afterward lost, and for a time was very poor. When the men who had gained millions in the oil business heard of his poverty, they raised some money for him, and the legislature of Pennsylvania voted \$1,500 a year as long as he or his wife should live.

HOW THE PETROLEUM GOT INTO THE DEPTHS OF THE EARTH

How is it that petroleum has come to be stored up for us in the earth? Where did the oil come from? At one time it was thought that mineral oil probably had what we call an inorganic origin—that it was formed in the earth by chemical means, and not from the bodies of ancient plants or animals which had become buried in the earth. It would be pleasant to think the inorganic theory true. Then we might hope it still to be going on, so that the supply of natural oil in the earth would continue until the end of time.

Unfortunately, however, we must give up that idea, for it is now generally accepted by scientists that we owe petroleum to the oily or fatty parts of long-buried living things.

Some geologists believe that both animal and vegetable matter were in the deposits from which we get our mineral oil; others think the oil is derived from animal remains only. It is probable that in some places the mineral oil was mainly of animal origin, and in others mainly vegetable. As in the case of coal, there

was a great variation in the conditions of production. Different oil-fields have different origins.

One of the great authorities on oil has given a sketch of the days when oil was formed. He asks us to picture an ancient forest of the Carboniferous Period, when the earth had cooled down and become solid and able to support life. The surface of the land had become covered with dense forests, growing on hot, marshy soils. The rich, luxuriant coat of vegetation which covered the earth from Pole to Pole was "sad and silent," with no flowers to enliven its foliage, and no refreshing fruit on its branches. The sky was sombre and veiled with heavy and brooding clouds.

THE COMING OF ANIMAL LIFE IN THE EARLY DAYS OF THE WORLD

The light scarcely made visible the dark tree-trunks. It was a shadowy and oppressive scene. It would have been a reign of indescribable horror had there been conscious creatures to observe it, but neither man nor any other air-breathing animal had as yet appeared on the earth. The seas, however, contained abundant fish and shelled molluscs.

And then followed a picture of a later time, during the Tertiary Period, when the formation of the world's store of mineral oil was being completed. Then the world, still luxuriant, had reached a higher stage of development and had become the home of many mammals, including creatures of prodigious size and curious shape, such as the ichthyosaurus, whose remains we now see in the large museums.

So the great animal and vegetable deposits accumulated. In one way or another which is not well understood these deposits were sometimes changed into coal and sometimes into oil and natural gas. Coal seems to be chiefly of vegetable origin, while oil often comes from a mixture.

The oil in the earth is stored in layers of porous rock, such as limestone or sandstone, or in beds of sand. When such strata are roofed in with a covering of harder rock we get an ideal oil-field. Imagine the strata sloping away in opposite directions, like the roof of a house. The gas given off by the oil is under the roof. The oil is thus under pressure, and if the oil rocks are drilled the oil is forced up to the surface of the earth like a foun-

THE STORY OF THE JOURNEY OF MINERAL



These pictures give a bird's-eye view of the great oil industry. The oil is being pumped out of the earth, and passing through a field storage tank and a transportation line to a tank steamer and tank cars.

OIL FROM THE EARTH TO THE REFINERY



In addition to water and rail transport, the oil is pumped for miles through pipe-lines. A series of pumping stations drive it forward till it reaches the refinery for treatment.

tain. This is what oil men call a "gusher." In some wells there is water under the oil, which pushes it up. From less abundant fields the oil has to be pumped.

No one knows how much petroleum there is in the world. Every year adds to the number of known fields, but every year, unfortunately, uses up a large part of the world's stock.

THE MILLIONS OF GALLONS OF OIL PRODUCED IN A YEAR

So rapidly is the use of oil increasing that the United States, so far the greatest oil-producing country in the world, is producing more oil than all the world gave us three years before. The future will undoubtedly see an even greater consumption. New oil-fields must be found, or the world will, before very long, exhaust its best supplies.

It is estimated that the whole world produces over a thousand million barrels of oil a year. The United States produces nearly three-fourths of this, and Mexico more than half of the remainder.

The other great oil-producing countries are: Russia (in normal times), the Dutch East Indies, South America, Roumania, India, Persia and Galicia. Canada has been producing a small quantity of oil, and has prospects of much greater production. Oil has been found in Ontario, the Prairie Provinces and British Columbia. Some rich wells have been drilled around Fort Norman in the Northwest Territories, just south of the Arctic Circle.

WHERE IS OIL FOUND IN THE UNITED STATES?

For years Pennsylvania furnished most of the oil used in the world, but later oil has been found in many other states. Now the leading states are California, Oklahoma, Texas and Wyoming, with Arkansas, Kansas and Louisiana following. Other states furnish millions of barrels.

Although the United States produces over two-thirds of all the world's oil, it by no means follows that it possesses two-thirds of the world's stock of it. The fact is that the United States has more quickly developed and used her oil resources. There is no doubt whatever that the world outside contains many times over the stock of oil possessed by the United States.

Indeed, scientists are becoming very anxious about the oil resources, and with good reason. As in the case of other rich

native resources, there has been prodigal waste in the use of oil. Men in a hurry to get rich have used hasty methods, and tapped oil-fields so carelessly that large parts of their contents have been thrown away.

It is said that in the oil-fields already exhausted in the United States from one-fourth to three-fourths of the oil has been left in the ground and lost. Then there have been heavy losses through bad storage and through fires.

THE TERRIFIC WASTE OF POWER CAUSED BY THE GREED OF MAN

Much oil has been wasted through competitive drilling. The oil-fields often have many small owners, and the oil of the same field can be tapped from many parts of it. A great deal of hasty and unnecessary drilling has been done by land-owners anxious to be the first to get the oil out of a district.

In the early days of the oil industry, when some of the best fields were tapped by men who did not understand what was going to happen when they made their drill holes, enormous quantities were lost through the oil spouting like a fountain and running away in a great stream before arrangements could be made to store it. This does not happen now.

The result of wasting oil will be to make petroleum dear in the time to come. It is important, therefore, that new oil-fields should be carefully preserved, and their drilling done scientifically. The world cannot afford to waste its resources, and it will need in future far more oil than it is likely to possess. Dr. Arrhenius, the famous Swedish scientist, has given it as his opinion that the world's consumption of oil is increasing so fast that the world will have used up its supplies by about 1940. This view is probably too gloomy, but it is certainly true that while there is a limited stock of oil, the world is every year finding greater need for petroleum. On the other hand, new oil-fields are being found and considerable parts of the world have not yet been thoroughly explored.

THE MANY ADVANTAGES THAT OIL HAS OVER COAL

As a fuel to burn for the purposes of making power to drive engines on land or sea, oil has many advantages over coal. Oil is easily handled, where coal is bulky and dirty. Coal must be carried by boat or train, but oil will travel in a pipe by its

own weight. Because it is a liquid, oil can be easily stored and drawn off from storage containers. That, of course, means a great saving in time and labor, and also in cost to the consumer.

The cleanliness of oil is much in its favor, and this is especially the case in ships. The coaling of a ship is a dirty and disagreeable business, but the oil tanks of a ship can be easily filled through a pipe. The officers and crew of ships which burn oil have good reason to bless the use of petroleum at sea.

THE AMAZING GROWTH IN THE NUMBER OF SHIPS DRIVEN BY OIL

Then, too, the oil takes up less room in the vessel than coal, and this means that cargo can be carried in the space which was once occupied by coal. In countries

Oil, too, is more certain in its use than coal. With it we can more easily maintain an even temperature. Also we avoid the handling of clinker and ashes. It is not difficult to install a suitable apparatus to convert a furnace from coal-burning to oil-burning.

WHY THE MINERAL OIL WILL PROBABLY NEVER TAKE THE PLACE OF COAL

On the other hand, oil is, so far, more expensive to use than coal. In the case of the sea, the space saved more than pays for this, but on land it is more economical to use coal, in spite of the advantages of oil. That is why we seldom heat our furnaces with oil instead of coal.

Some people imagine that oil can supplant coal for general use. It is a great pity that this is not really the case, for



Photo, courtesy Denver and Rio Grande Western Railroad.

MOUNTAINS IN COLORADO CONTAINING LARGE DEPOSITS OF OIL SHALE

where oil is cheap, enough to make the round trip can be carried in a space large enough to carry coal only one way. Therefore, an oil-burning ship is more profitable to run than a coal-burning vessel.

This is the case even in a steamship which uses oil instead of coal to boil the water and produce steam. Even more is it true with the new-fashioned motor ships, in which steam is abolished because the engines are internal-combustion engines, something like those of a motor car. Motor ships, of course, need no boilers, so that the only space taken up by the driving apparatus is the motors themselves and the oil tanks. That leaves still more room for cargo or passengers. We can see why the number of oil-burning ships grows larger.

the disadvantages of coal are many. The truth is that while the world's coal and oil are both limited, the world has far more coal than oil, so that enormous deposits of unused coal will remain long after the oil is exhausted. Therefore, natural oil does not doom coal. The world as a whole has enough coal to last for centuries, even if consumption greatly increases. Coal will long outlast natural mineral oil.

THE MANY USEFUL PRODUCTS THAT ARE OBTAINED FROM CRUDE PETROLEUM

Mineral oil is a composite substance, consisting of many kinds of hydrocarbons. By various processes of refining these are more or less separated from each other, and used for a large variety of purposes. By distillation the petroleum is broken up into fractions of very differ-

ent properties and uses. Among the chief of these are gasoline (called petrol in Europe), kerosene and various lubricants.

The use of gasoline has rapidly extended with the growth of the motor car. Unfortunately only a small proportion of gasoline can be extracted from a given quantity of petroleum. A hundred barrels of crude petroleum yield less than one-third as much gasoline, and the world is now demanding something like 1,000 million gallons in a year. Gasoline consists of very volatile—that is, easily evaporated—spirits, and when mixed with air it forms a powerful and useful explosive. That, of course, is how the motor-car engine works. A small portion of the explosive mixture of gas and air is admitted behind the piston in the cylinder, fired by an electric spark, and by the resulting explosion the piston is moved.

Kerosene, which is oil for burning, varies greatly in quality. It is refined to stand a certain fire test, so that it may be used with comparative safety in lamps, although, of course, there is always danger in the use of such a substance unless great care is taken. In two ways petroleum is used for lighting. The simplest and oldest way is to burn kerosene in a lamp with a wick, but of late years hundreds of special lamps have been invented, some of them very ingenious. Kerosene stoves for cooking and heating are also much used.

Gasoline is also employed for lighting. It is vaporized and the vapor mixed with air in a special apparatus. The mixture burns with a very hot but non-luminous flame, and this is used to heat an incandescent mantle, as in the case of ordinary gas-lighting.

The use of lubricating oils derived from petroleum is also important. In some cases the crude petroleum forms a suitable lubricant with little or no treatment; in others it has to be carefully prepared. The consumption of such lubricants is also increasing rapidly, and this makes a further demand on the oil supplies of the world.

The main uses of mineral oil are found in power, in lighting and in lubricating, but modern chemists are developing many by-products. About two hundred substances have been gotten from crude oil, and the chemists say they will get many more. It is quite probable that in the

time to come we shall use dyes, artificial india-rubber, and so on, derived from petroleum. From 90 to 95 per cent of the gasoline which is distilled is used in internal-combustion engines of widely varying types.

Refined petroleum and vaseline, or petroleum jelly, are very valuable medicines. The Indians rubbed petroleum into their skins to ward off rheumatism. Another valuable material derived from petroleum is paraffin wax. It has a hundred different uses, not only in making candles, but in match-making, electrical insulating, polishing, and so on.

How widely different, indeed, are the minor uses of petroleum may be illustrated by two more examples. The wonderful modern dry-cleaning of clothes, which often makes them look almost as good as new, is done with gasoline. And when Dr. Gorgas fought the deadly mosquito in making the Panama Canal, he used petroleum to coat the surface of the stagnant waters in which the mosquitoes bred, and so destroyed them.

Finding oil is difficult, but getting it out of the ground is an easier matter than coal-mining. In the case of coal, we have to make a very big hole and go down into the grimy depths and fetch up to the surface a heavy substance. In the case of oil, we drill a small hole, and either pump up the oil or let the natural pressure, if it exists, force the oil up to us.

There are many different ways of drilling the hole. The modern and most approved way now coming into general use is the rotary method. A great wooden pyramid called a derrick is erected, from sixty to a hundred feet high, to support the machinery necessary to drive a rotary bit, which works like the familiar carpenter's bit, biting its way through rock as the carpenter's bit bites through wood. It is very rapid in its work, drilling the necessary hole in a few weeks.

The pulverized bits of rock cut by the descending tool are washed out of the hole as it descends, by a stream of water working under pressure. As the mud comes to the surface the nature of the rock through which the tool is biting is revealed.

The hole made by the drill is lined with an iron pipe. An oil well is thus a long thin iron tube, piercing through the rock until the porous layer containing the oil is reached.

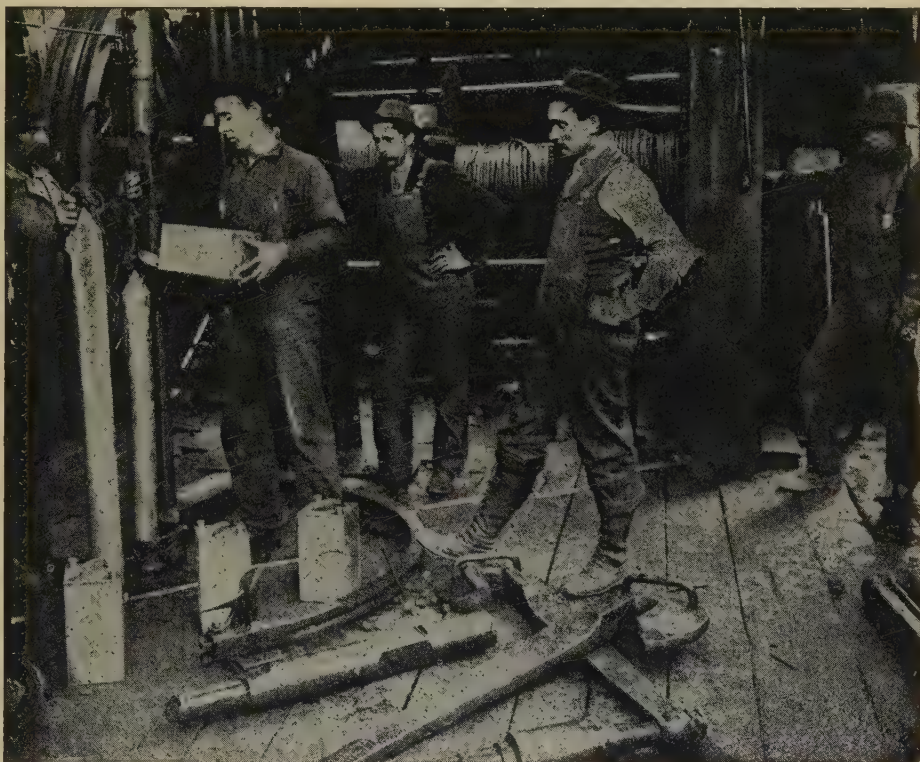
WHAT IS MEANT BY "TORPEDOING A WELL"

In the days when wells were drilled for salt water, it was found that by exploding powder in the bottom of the well sometimes more brine could be secured. The same experiment was tried with the oil wells and was often successful. At first powder was used, but it was soon found that nitroglycerine was better. This substance is a mixture of nitric and

explosion of this kind, but the increase is not permanent.

SENDING OIL TO MARKET UNDER THE GROUND

In the early days of the industry, one trouble which developed was the cost of carrying the oil. The roads were bad, and the teamsters charged high prices for carrying the oil. Then, too, the barrels were expensive, and not many of them could be carried on a freight car.



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In order to increase the flow of an oil well, a charge of nitroglycerine is often exploded at the bottom. Here we see the men pouring the fluid into a tin cylinder. It is then carefully let down to the bottom, and then a weight is dropped down the tube. The resulting explosion often sends a fountain of oil high into the air, as you can see on page 4547. Sometimes the flow is permanently increased, but often the greater production does not last.

sulphuric acids and glycerine, and is very powerful. A few drops will wreck a house if it is struck sharply. It does not always explode from fire. Cans of it are carefully let down into a well and a little powder is put in a cap on top. Then a little iron weight is dropped. This explosion shatters the rocks in the bottom and cleans out the paraffin which had clogged the well. Sometimes wells which before had furnished only a few barrels a day yielded hundreds after an

So wooden tanks were built upon the cars, and then iron tanks like a boiler were built. Every stream had a fleet of flat boats which carried oil to market.

Only a year or two after the oil wells were opened a man thought of the plan of running the oil to market in a pipe. The teamsters, angry at seeing their business broken up, destroyed the first pipes and sometimes there were riots. But the new plan saved so much expense that others were built, and now there are

thousands of miles of pipes running from the oil wells to the refineries, or to the seacoast, not only in the United States but in other oil-producing countries.

Every few miles are powerful pumps which drive the oil onward. Sometimes the paraffin collects on the sides of the pipes and almost clogs them up. When this happens, a little machine with sharp, revolving knives is put into the pipe. The pressure from behind pushes it along, and the inside of the pipe is scraped clean. This is usually called a "go-devil."

THE GREAT OIL TANKS THAT CROSS THE SEA LIKE SHIPS

The vessels which transport oil, familiarly called tankers, are built specially for the purpose and are simply great floating tanks. They are very unpleasant to work in, for everything in them reeks of oil. The men, therefore, get extra pay, and it must be admitted that they earn it.

There are now modern oil wells and pipe-line systems for working oil in many countries, from Canada to Peru, on the American continents; in Russia and in Central Europe; and in the Far East from Japan to Borneo. It is a vast but very speculative industry, in which the capital employed sometimes earns very high profits and sometimes earns no profit at all. As we write, for example, some of the Mexican oil-fields now yield salt water in place of oil.

WHEN THE OIL COMES TO THE REFINERY

Much of the oil is used just as it comes from the ground, but to get the various products it must be refined. Now, crude oil is a mixture of various substances which do not have the same boiling-point. They are separated by the process known as "fractional distillation." It is very complicated, and great care must be used, but this is the important idea. The crude oil is placed in great steel tanks, each of which holds several hundred barrels. When heat is applied the lightest substances pass off in the form of vapor, which is condensed into liquid. As the heat is increased the next heavier substances pass off and in turn are condensed. The order is cymogene, rhigolene, petroleum ether, gasoline, the naphthas, and so on.

What is left is still further treated in various ways to get lubricating oils, paraffin, petroleum jelly, or vaseline, and

what is left of some oils is a sort of asphalt. By special processes some of the heavier oil can be "cracked," that is, changed into gasoline or naphtha. Formerly ten barrels of gasoline or less could be obtained from a hundred barrels of oil. Now often thirty barrels may be obtained.

None of these substances can be sold just as it comes from the still. It must be treated with various chemicals to remove impurities, some of which have a very unpleasant odor.

THE DAY WHEN THE WORLD'S SUPPLY OF OIL MAY COME FROM COAL

We have spoken of the world's coal as being greater in quantity than the world's oil. It is not impossible that when all the natural oil has been consumed, oil for motors will be distilled from coal. Already benzol, a light spirit suitable for motor cars, has been produced as a by-product of coal in the preparation of coke. Not very much benzol is yet produced, however, from one ton of coal. Nevertheless, the fact that a practical fuel is produced—with other exceedingly important by-products—in the scientific coking of coal, may show us a time coming when not an ounce of the coal we produce will be wasted. Thus, while the world has a very limited amount of natural mineral oil, it has in coal the means of producing much larger quantities of artificial mineral oil.

There is another possible source of oil. In some parts of the world there are deposits of bituminous shale. Shale is clay which is on the way toward becoming rock, and bituminous shale is that which contains bitumen. This contains a considerable quantity of oil which may be extracted by distilling the shale. From thirty to fifty gallons of crude oil may be obtained from a ton of shale, and the oil may be separated into naphtha, kerosene, and so on, just as the oil obtained from wells. Already much shale-oil is obtained in Scotland, and the world may be driven to use more of this.

As we have mentioned before, there is also the possibility of using alcohol for power. The right type of engine has not yet been invented, but it is certain to come. So, even if the oil wells yield less and oil becomes dearer, we shall probably be able to get the power to run our motor cars, though it may cost more than at present.

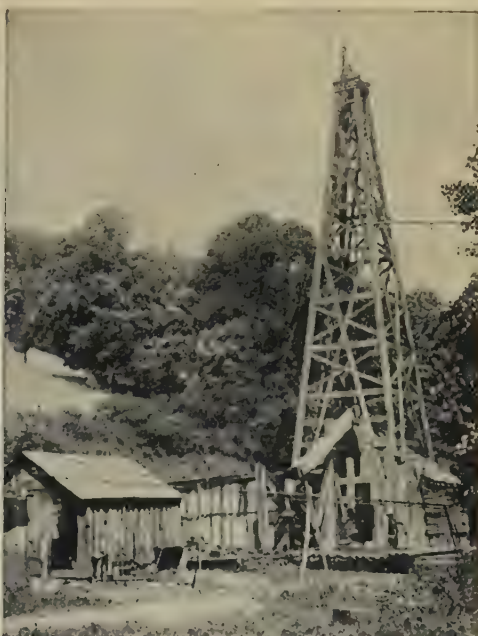
THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 4669.

PICTURE-STORY OF OIL

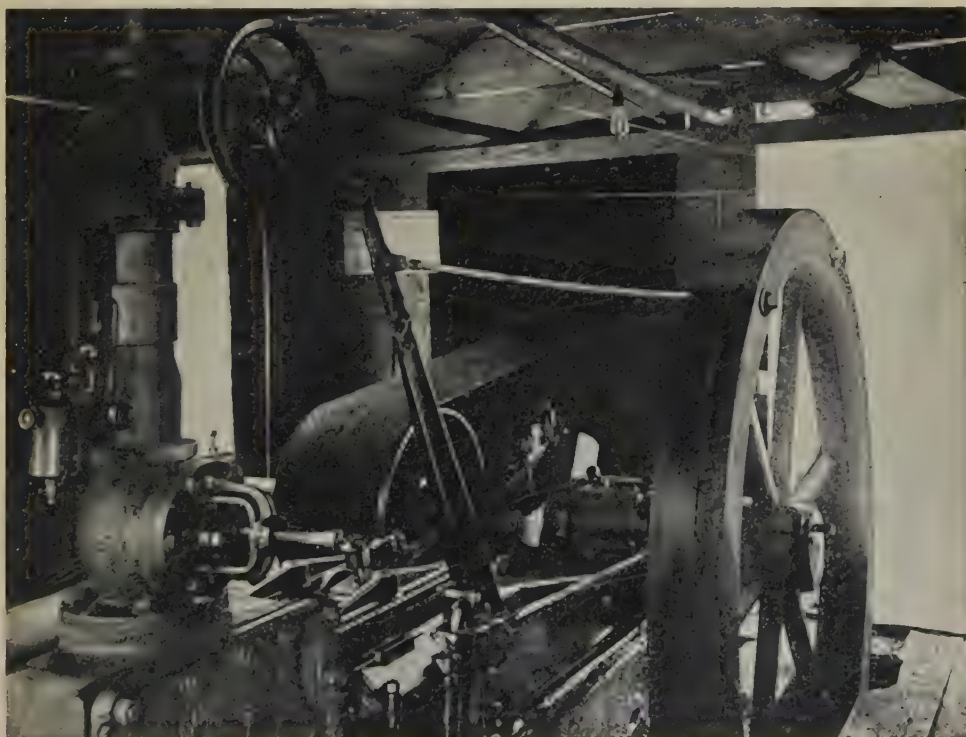


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The very first oil well, sunk at Oil Creek in Pennsylvania, in the year 1859, by Colonel Drake, who is seen in a tall hat in the centre of the picture.

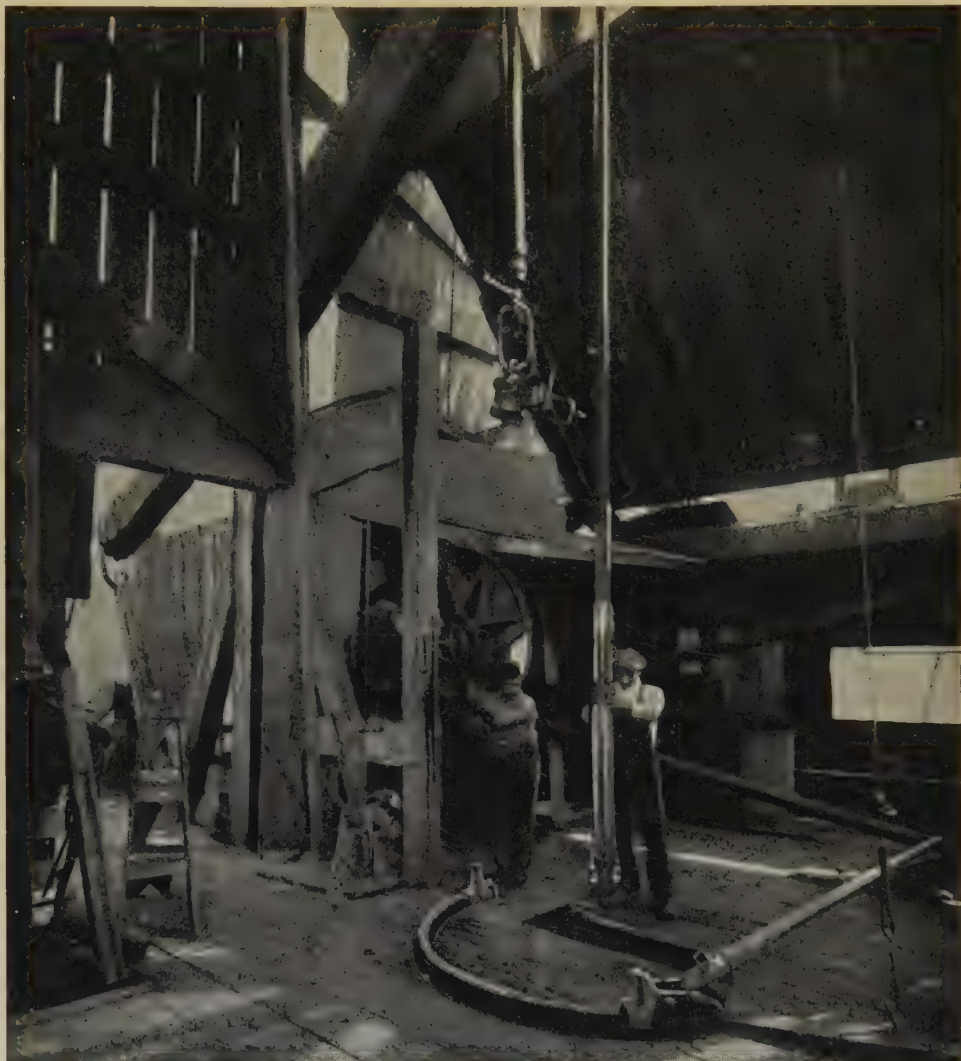


This oil well at Fairmount, in West Virginia, going down nearly a mile and a half, is the deepest oil well in the world.



Powerful engines are needed to drill deep wells through the many layers of hard rock, and this is the engine that made the bore of the deepest well in the world, shown in the top right-hand picture.

THE OIL-BORER AT WORK



Oil wells are often bored, not in the way a gimlet makes a hole, but by striking up and down with a massive steel chisel. The lofty derricks are erected over the wells in order that the chisel may rise and fall.



Some wells, however, are bored with a gimlet-like motion, lengths of pipe being driven down by a rotary movement, each new length being screwed on the previous one. Here are some of the drill pipes used.

OIL-TOWERS IN EAST AND WEST



This derrick stands at Point Firmin, in California, and is used for driving a well at a point beneath a cliff, where at high tide the sea covers the site.



Here is an imposing derrick. It is a substantial structure, and stands over a deep well in Galicia. It has regular staircases and a watch-tower.

THE OIL GUSHES OUT OF THE EARTH



A remarkable photograph of an oil-gusher at Baku, on the Caspian Sea, spouting out oil at the rate of many tons every minute of the night and day. In the Baku oil-fields much oil has been wasted, owing to crude methods of working.



Oil is obtained in many parts of the world, and this picture shows part of a large oil-field in Burma.



In the Arctic North oil has been tapped, and here is a gusher near Fort Norman, in northern Canada.

THE RICHEST OIL WELL IN THE WORLD



The great Lakoview Gusher in California is said to be the most profitable oil well in the world. Oil was struck at a depth of 2,000 feet, and the stream blew off the top of the derrick. It shot up 300 feet into the air, and poured out oil at the rate of nearly two million gallons a day.

OIL AMONG THE SNOW AND OIL ON FIRE



Some of the world's richest oil wells are in warm countries, like Mexico and Burma, and others in countries that experience severe weather in winter. Here is a winter scene in the Galician oil-field.



A fire among the oil wells or great oil reservoirs is a very serious matter. This picture shows two storage tanks on fire in Oklahoma, both set alight by lightning. Enormous volumes of smoke are formed.

OIL WELLS ON LAND AND OIL WELLS AT SEA



Rich oil supplies lie under the bed of the Pacific Ocean off California, and hundreds of borings have been made to reach and tap these. This picture shows the strange scene where the derricks stand off shore.



© Underwood and Underwood.

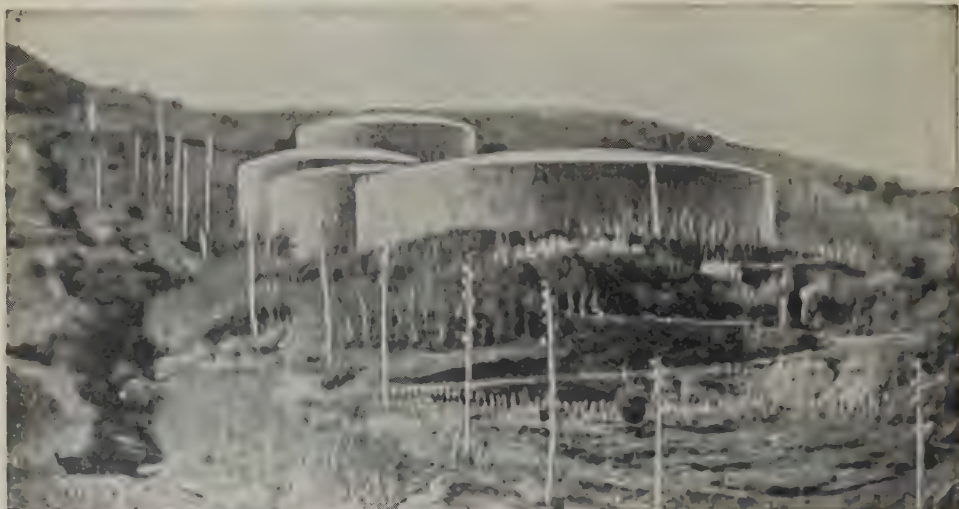
It is, of course, easier to bore wells on land than at sea, and these derricks in Texas are of the latest type, and contain the most modern machinery. The district near Beaumont is now a rich oil region.

A SOURCE OF OIL IN THE FUTURE



Here is a part of the great Naval Oil Shale Reserve near Rifle, Colorado. By distillation oil can be obtained from this shale. So far the shales have been little utilized because it has been cheaper to get oil from wells, but when the wells begin to fail, large quantities of oil can be gotten from such deposits as this, found in many parts of the world.

U. S. Navy Official Photo.



Rumania is one of the world's greatest oil districts, and the oil is prepared for the market in refineries near the wells. These are some of the reservoirs in which the refined oil is stored ready for market.

OIL'S 6,000-MILE JOURNEY TO THE TANKS



The refining of oil is an important industry. The Anglo-Persian Oil Company's refinery at Hamdary is one of the best-equipped in the world. The oil is brought in tank vessels from the wells 6,000 miles away, and is pumped into storage tanks, and then through these six great pipelines to the refinery.

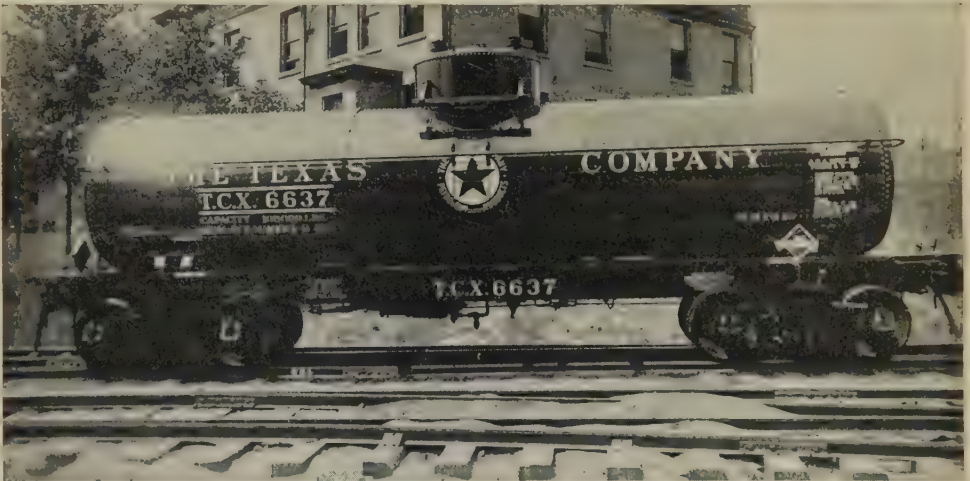


The refining of petroleum is a very complicated process. It is distilled and many different products are obtained such as gasoline, naphtha, benzene, kerosene, lubricating oil and many others. Great improvements have recently been made in the process and larger values than formerly are now obtained from the crude oil. This picture shows the first series of stills into which the crude oil goes.

THE OIL IS BROUGHT TO OUR TOWNS



Formerly oil was shipped in barrels, but now tank steamers like this are built with the engines at the stern. Into the vessels the oil is pumped through pipes, and it is discharged in the same way.



On land the great oil companies use tank cars such as this to transport oil and its products by rail from the great reservoirs to the localities where they will be used.



The oil or gasoline is delivered to the small dealer and to some private consumers by motor tank trucks. One of these can cover a large territory.

The photographs on these pages are by courtesy of the Oil Well Supply Company, the British Petroleum Company, the Texas Company, the Fairfield Shipbuilding Company and others.



How some of the money we pay is spent.

GOVERNMENT AND TAXES

A NATION is in some ways like a club. Because we belong to this big club we enjoy many advantages. When we join a country club we agree to obey the rules and to pay the dues and we are glad to do so because we hope to get value for our money. By joining together and sharing the expenses we have advantages we could not hope to enjoy by acting singly.

It is much the same with our big national club, the members of which number many millions. Because we belong to a great nation we are protected by laws made for our benefit and carried out by officials specially trained to do the work. We have an army and navy to protect us in war, judges to decide law disputes, inspectors to see that the laws are obeyed, a national money system to enable us to exchange goods, prisons in which to put wrongdoers, good roads for our vehicles, and special men appointed to care for such important things as agriculture, commerce, labor, education and the mails. In modern times, too, the government has cared more and more for the training of children and for the protection of those who are not able to look after themselves. So we have established departments to care for education and for public welfare,

CONTINUED FROM 4444



as matters dealing with social questions are often called.

The number of people employed in all the departments of government is counted by the thousand, and this does not include the many employed in the post office or the teachers in the schools. All these people have to be paid, and they are paid out of money which we help to find.

Then, too, the government is a great consumer of goods. It is a great builder and must pay for the brick, stone, wood, iron, cement and other things which go into its buildings. It uses great quantities of coal or oil to heat and light the many buildings. It is a great printer, and its bill for paper is enormous. It owns many vehicles of various sorts. It buys furniture for offices, cloth for uniforms, food for animals and hundreds of other things. It must pay for all of these things, and they require a great deal of money.

The government cannot get money out of the air. It must either take the money from residents of the country or else must borrow it. When it borrows money it must pay interest until the loan is repaid. So it comes back, after all, to getting money from those who dwell in the country.

We may make a slight exception

here. In a new country like ours the government has owned a great deal of the land, and, of course, the forests on it and the minerals under it. Much of this land has been sold, but some remains, and in some few cases the government gets what we may call Rents or Royalties from land. However, the amount received from these sources is only a small part of the money the government needs and must have.

How, then, does the government get all of the enormous sums it spends? Does it ask all the citizens to contribute the same amount, or does it ask each to give as much as he thinks proper? It does neither of these things. The government decides what sums each shall pay, and these are called Taxes.

THE NATIONAL CLUB OF WHICH WE ARE ALL MEMBERS

Now we see the essential difference between a club such as a country club and the big club we call a nation. In the case of the private club, we can join or not as we like, and no one can compel us to do so, or to pay the dues unless we wish. In the case of the nation, we are born members of it, and unless we leave the country and become citizens of another country, we are, as it were, compulsory members of the club and are compelled, whether we like it or not, to pay the taxes which are levied against us. In fact, if we are citizens of one country but live in another, both countries are likely to tax us. It is an offense against the law not to pay a tax.

Taxes, then, are sums compulsorily paid by citizens toward meeting the expenses of the government.

Before the World War the taxes levied by the nation were large in total amount, but the average sum paid by the citizen was not very large. The taxes levied by the towns and other divisions of the nation were much greater than the taxes levied by the nation itself. All this has changed. The expenses of the war were so great that it was necessary for governments to borrow large sums, and now the taxes which we must pay to the nation are several times as great as they were before the war.

Such a gigantic national expenditure is a great burden on the nation. It must decrease as the years go on, but for a very long time the national purse will need heavy sums to fill it, and therefore taxes must remain high. We can see how

heavy the burden is by dividing the amount the nation raises in a year by the number of inhabitants.

THE TAXES THAT ARE LEVIED WITH EQUAL JUSTICE FOR ALL

If we think for a moment we shall see that it would not be fair to take the same amount from each person. Some have so little that the tax would be a very heavy burden, while others have a great deal more and could pay this average amount without difficulty. It is because incomes are so unequal that the taxes have been so arranged as to take much from those who are well-to-do and much less from the poor.

One of the best-known of economists, Adam Smith, long ago laid down a famous maxim for tax-makers which ran as follows:

The subjects of every State ought to contribute towards the support of the Government as nearly as possible in proportion to their prospective abilities; that is, in proportion to the revenue which they respectively enjoy under the protection of the State.

This maxim, although good, had to be improved on because the ability of a man to pay taxes is not really in proportion to his income. Take the case of two men, one with \$2,000 a year and the other with \$20,000 a year, and suppose we tax both in proportion to their incomes by levying 10 per cent on each. The man with \$2,000 a year would pay \$200 and have \$1,800 left for himself. The other would pay \$2,000 in taxes and would have \$18,000 left for himself. The burden of 10 per cent upon one man is therefore much heavier than the burden of 10 per cent on the other. *By taxing in proportion to income we impose on the poor a heavy burden and on the rich a comparatively small burden.*

THE MILLIONAIRE'S BIG TAX AND THE POOR MAN'S MITE

This consideration led to the development of the maxim of taxation now generally accepted: *Taxes should be levied in such a way as to establish equality of sacrifice between rich and poor.*

This is the principle which is now carried out with more or less success in the taxes we all pay. A millionaire pays very heavy taxes while he lives, and in most countries his heirs have to yield up in tax a large proportion of the value of his estate when he dies. A poor man

pays little in direct taxes, or, indeed, he may escape direct taxation altogether. A moderate income pays a moderate tax.

The question of the manner and the degree of justice with which taxes are levied is far more important now than it used to be, because the national expenses have become so great.

THE TAXES ON PEOPLE AND THE TAXES ON THINGS

Taxation has occupied much of the attention of government since civilization began, and hundreds of different taxes have been levied at different places at different times. However, we can divide them in a few classes.

Direct taxes. These are sums which are demanded directly from the person who has to pay them and which cannot be shifted to another. The principal direct taxes are: the Poll Tax, the General Property Tax and the Income Tax, and taxes on the estate of a dead person. These last are called Inheritance Taxes, Death Duties, Succession Duties or some such name. There are other less important direct taxes.

Indirect taxes. These are levied chiefly upon things which are to be sold, so that the people who buy the things pay the tax whether they know it or not. The principal indirect taxes are Customs, or Tariff Taxes and Excise Taxes.

The nation levies both kinds of taxes, but up to the World War chief dependence was upon indirect taxes, since the people who paid them usually did not know that they were being taxed. Since the war the direct taxes bring in more revenue.

THE BURDEN ON A MAN WHO GIVES UP A THIRD OF HIS INCOME

The Income Tax is a levy on incomes. It is paid by all those having an annual income of a certain amount. Persons of small means are excused from the tax altogether. When a man is married he pays less than if he were single; and if he has children he pays less still; that is to say, an allowance is made to him for his wife and children. The tax is arranged in steps, so that those having large incomes pay much more on every dollar than those with small incomes. This variation is called *graduating* the tax.

To obtain more money still from the rich, a second income tax is imposed called the Surtax. It is levied on those with more than a few thousands a year. With income tax and surtax, the income of a

rich man is very heavily taxed indeed. During the World War and the first years afterward, the government took more than half of very large incomes.

In some countries taxes levied on the value of the estates or possessions left by those who die have brought in large sums. Very tiny estates are entirely excused from the tax. As in the case of the income tax, the duty is graduated so that a little fortune pays not very much and a big fortune pays very heavily.

THE MOST IMPORTANT OF THE INDIRECT TAXES

Now let us come to the indirect taxes. The most important of these, as we have said, are: the Customs, or Tariff Taxes, and the Excise Duties. Let us take the Tariff Taxes first. If you can find a copy of the act now in force you will see that hundreds of articles from foreign countries are taxed. This taxation has a double purpose. We are told that the purposes are to raise revenue and to protect home industries. We know what is meant by raising revenue, but what does protecting home industries mean?

Sometimes we can grow or manufacture an article and think it would be for the welfare of the country if we did. However, for one reason or another a foreign country can produce it more cheaply. This reason may be lower wages, greater experience or larger production. If the foreign goods are allowed to come in free of tax, we cannot grow or manufacture the article at a profit, but if the foreign product pays a tax, we may be able to do so. Many people think it wise to put a tax on the foreign goods, thus raising the price at which they can be sold. We may be able to produce the goods at this higher price, and so wage-earners and manufacturers are more prosperous. On the other hand, we levy taxes purely for revenue on articles which we cannot produce. A good example is the tax on tea or coffee.

WHAT WE REALLY PAY FOR WHEN WE BUY A POUND OF TEA

When tea is imported it is taxed at the seaport. The tea having been bought wholesale and the tax paid to the government, *each pound of the tea is raised in price by the amount of the tax at least.* The wholesale merchant sells it to the store-keeper at a price which includes the tax, and the store-keeper sells it to his customer, of course, at a price which also includes the tax.

Therefore, when we go to the grocery store and buy a pound of tea, *what we really buy is tea and tax*, and there is no one to tell us, if we do not know it, that part of the price of the tea is not paid for tea at all, but for tax. Every time we buy a pound of tea we pay so much toward the government's expenses.

We can see from this that the tea tax is not graduated in favor of the poor as the income tax is. When a poor woman buys a pound of tea she pays as much tax as when a rich woman buys a pound of tea. This is the great fault of indirect taxation, but governments stick to such taxes because they are effective and because people do not notice that they are being taxed in this way.

TAXES THAT WE NEED NOT PAY UNLESS WE LIKE

Now we come to some other indirect taxes levied by the national government. They are usually called Excise Taxes, from a French word meaning taxes. Such are the taxes on the manufacture of alcohol and tobacco. Alcohol, whether intended for drinking or not, must pay a tax which amounts to millions of dollars every year. The tax on tobacco, however, is much larger, and forms a considerable item of revenue. This is a tax which a man pays if he uses tobacco. If he does not, he escapes it. All governments get considerable revenue from this source.

Another tax is the stamps required to be placed on certain documents. This, again, is paid only if we have occasion to need one of the documents. Such taxes have been more common in Europe than in this country.

So far we have dealt principally with the taxes which are levied by the nation. Our other governments in town and country have also to levy taxes to pay their expenses, which are very heavy, tending to increase, and often form a serious handicap to local trade.

SOME THINGS FOR WHICH LOCAL GOVERNMENTS PAY

Education is the concern chiefly of the government of the smaller divisions of the nation, though the national government does pay a small part of the cost. This is one of the heaviest local expenses. Towns must have streets and sewage systems, and must provide magistrates, policemen, firemen and a street-cleaning force. Roads and bridges must be built

in the country. Lighting and water systems must be provided either by the public or by private parties. In either case the cost is large. The support of the poor is a local expense, and so is the cost of insane asylums, hospitals and the like. There are dozens of other things for which the governments must pay.

Much of this money is raised by the General Property Tax. This is a tax on land, houses and other property. The amount of the tax depends upon the value of the property and not upon the income from it. That is, a man who owns a vacant lot which he is holding for an increase in price must pay a tax on it even though he receives no income from it. In Canada the tax on the estate of a dead person belongs to the Province. In the United States the federal government levies such taxes, and some of the states also impose them. Local governments levy many other kinds of taxes.

There are dozens of other taxes which we may have to pay. For example, there is a tax on the value of a motor car when we buy it, and then a yearly fee must be paid. This fee varies with the power or weight of a car, and the money is usually devoted to keeping up the roads. Sometimes every gallon of gasoline is taxed for the same purpose. The idea is that if a man can afford to keep a motor car he can afford to pay something extra to the state.

Shooting and fishing licenses belong to the same class, but the money received from them is usually spent for the protection and increase of game and fish. There are other license taxes. Sometimes a license is required to follow a particular trade or profession, or to keep a particular kind of shop. The laws on this subject are not the same everywhere, and if we gave them all, we should have to print many pages of tables.

You see that taxes are a very important subject and require much study. The people constantly demand better schools, better fire protection, better roads and bridges, and so on. They ask that the local governments undertake new things, but they complain if taxes are high, and say that high taxes hurt business. It is very hard to know what is the right thing to do. Very high taxes do hurt business, and yet without high taxes we cannot have the kind of country we feel we should have.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 4811.



THE SILENT PRINCESS

A CERTAIN king who had twelve sons was so eager to have a daughter that he consented to slay every one of the young princes if only he might have a daughter sent him in their stead.

When the queen heard of this bargain which her husband had made with the King of the Dwarfs she wept bitterly, and declared that no daughter could make up to her for the loss of her handsome sons.

The youngest son, finding his mother in tears one day, inquired what grieved her.

"Alas!" she answered, "the king, your father, has bartered your lives for the sake of a baby girl who will shortly be born. On the day she arrives you are all to be put to death."

"Do not weep," replied the young man. "We will go away and hide so that our father's threat may not be fulfilled."

Before long the baby princess was born, and so fair and sweet was she that she quickly won the hearts of all about the court. She was always dressed in white, and on her forehead hung a golden star, as golden as the beautiful hair that fell in silken tresses about her lovely neck and shoulders.

As the years rolled by the lovely girl grew into a beautiful young woman, with whom more than one prince fell deeply in love. But she would listen to none of them, and was as

CONTINUED FROM 4489



happy as the day was long until by chance she learned the story of the fate of her brothers. In an idle mood she had found her way to a disused attic room, and there, at the bottom of an old

dusty box, she had come upon twelve little shirts. Carrying them to her mother, she asked to whom they belonged. "They are much too small to fit my father," she said.

At this the queen burst into tears, and related the whole of the sad story.

"Oh, how cruel!" exclaimed the princess when she knew all the story. "But do not weep. I, who have been the cause of so much sorrow, will go in search of my poor brothers."

So, with the twelve little shirts in her hands, she set out. For a whole day she traveled through the woods, and at dusk she met a young man who stood amazed to see so lovely a maiden unattended in such a place. He asked if he could help her, and thereupon the princess explained that she was seeking her brothers, who many years before had been compelled to take refuge in the woods.

"I know not even if they be still alive," she said; "but it was for my sake that they left their home, and I am seeking them in the hope that I may be able to make their exile a little less lonely. See, here are the small shirts which they used to wear when they were very young."

As soon as his eyes fell upon the shirts the young prince recognized them.

"My dear little sister," he cried, embracing her, "you are indeed our deliverer!" And taking her hand, he led her to a little wooden hut, very empty of all save the barest necessities.

By and by the other brothers returned, and they, too, welcomed their sister gladly. But one day as they all sat by the fire the princess noticed twelve tall lilies growing together in the garden, and she ran out and plucked them, meaning to give one to each of them. But the flowers were magic flowers, and as she picked them the twelve brothers changed, one by one, into great blackbirds, which flew off without a sound into the forest. At the same moment the little house disappeared, and the princess found herself alone in the midst of the wild woods.

Instead of giving way to despair, however, she bravely set out to find a path, but before she had gone far she came upon the cruel King of the Dwarfs.

"Is there no way by which I can rescue my brothers?" she asked.

"There is only one way by which you can break the spell," answered the dwarf; "and that is by remaining dumb for seven years."

Terrible as this condition was, the princess determined to carry it out. So she found a high tree and seated herself in one of the branches. But that very afternoon the king of that country rode by, and as he passed the foot of the tree he looked up, and instantly fell in love with the beautiful maiden with the golden star upon her forehead.

"Will you be my bride?" he asked in a soft voice.

The princess gently nodded her head; but not a word did she utter. So the king, greatly astonished, lifted her down, set her on his horse, and carried her away to his palace. Here they were married in great state, and they lived together for six happy years.

Now, the king had a mother who was terribly jealous of the young girl, and was wicked enough and cruel enough to invent all sorts of untrue stories about her.

For a long time the king had refused to believe any ill of his gentle lady; but the old queen so persisted in her stories that he at last begged his wife to speak, if only one word, to deny them. But still she kept silence, until even the king himself began to doubt her innocence, and the day came when he consented to have her put to death.

A great fire was kindled in the courtyard of the palace, and the innocent young queen, tied hand and foot, was waiting to be thrown to the flames, when suddenly the sky darkened, and, to everybody's amazement, twelve great blackbirds flew down. At that very moment the seven years expired, and the blackbirds changed into twelve handsome young men, who had come to release their sister.

The happy queen, who was now free to speak, ran to the palace, where the king sat alone in his grief, and related all that had taken place. The king was overjoyed at her news, and embracing her, begged her forgiveness.

Great rejoicings took place at the palace that night. The old queen was instantly banished from the kingdom, and the young queen, with her husband and her twelve handsome brothers, lived happily together all their lives.

THE CUNNING FARMER AND THE DWARF

A FARMER, whose land included a little hill, decided that this should not lie idle, and so began to plow it up. Immediately a dwarf who lived in the hill came out and angrily asked how the farmer dared to plow on the roof of his house and disturb his rest. The farmer apologized very humbly, and then suggested that it was to the interest of both of them that the hill should be plowed and crops grown.

At first the dwarf would not agree, but the farmer did his best to persuade the little man. He offered to do all the work

himself if the dwarf would agree that the first year the farmer should have what grew above the ground, while the dwarf had all below the ground, and the second year the farmer should have what was below and the dwarf that which was above.

The dwarf was quite willing to fall in with this arrangement; but the cunning farmer planted corn the first year, and left the roots for the dwarf, while he took the grain, and in the second year he planted carrots, and left the tops for the dwarf, while he took the roots.

HOW RIP VAN WINKLE WENT HOME

AS Rip Van Winkle approached the village after his long sleep, about which we read on page 4485, he met a number of people, but none whom he knew, which somewhat surprised him. Their dress, too, was of a different fashion from that to which he was accustomed. They all stared at him with equal marks of surprise, and whenever they cast their eyes upon him invariably stroked their chins. The constant recurrence of this gesture induced Rip involuntarily to do the same, when, to his astonishment, he found his beard had grown a foot long!

He had now entered the outskirts of the village. A troop of strange children ran at his heels, hooting after him and pointing at his gray beard. The very village was altered: it was larger and more populous. There were rows of houses which he had never seen before, and those which had been his familiar haunts had disappeared. Strange names were over the doors, strange faces at the windows—everything was strange.

His mind was now troubled: he began to doubt whether both he and the world around him were not bewitched. Surely this was his native village, which he had left but the day before. There stood the Catskill Mountains; there ran the silvery Hudson at a distance; there was every hill and dale precisely as it had always been.

Rip was sorely perplexed. "That flagon last night," thought he, "has addled my poor head sadly!"

It was with some difficulty that he found the way to his own house, which he approached with silent awe, expecting every moment to hear the shrill voice of Dame Van Winkle. He found the house gone to decay—the roof fallen in, the windows shattered, and the doors off the hinges. A half-starved dog that looked like Wolf was skulking about it. Rip called him by name, but the dog snarled, showed his teeth, and passed on. This was an unkind cut indeed. "My very dog," sighed poor Rip, "has forgotten me!"

He entered the house, which, to tell the truth, Dame Van Winkle had always kept in neat order. It was empty, forlorn and apparently abandoned. The desolateness overcame all his fears; he called loudly for his wife and children;

the lonely chambers rang for a moment with his voice, and then all again was silence.

He now hurried forth and hastened to his old resort, the village inn, but it, too, was gone. A large rickety wooden building stood in its place, with great gaping windows, some of them broken and mended with old hats and petticoats, and over the door was painted: "The Union Hotel, by Jonathan Doolittle." Instead of the great tree that used to shelter the quiet little Dutch inn of old there was now reared a tall, naked pole, with something on the top that looked like a red nightcap, and from it was fluttering a flag on which was a singular assemblage of stars and stripes.

All this was strange and incomprehensible. He recognized on the sign, however, the ruby face of King George, under which he had smoked so many a peaceful pipe; but even this was singularly altered. The red coat was changed for one of blue and buff, a sword was held in the hand instead of a sceptre, the head was decorated with a cocked hat, and underneath was painted in large characters: "General Washington."

There was, as usual, a crowd of folk about the door, but none that Rip recollected. The very character of the people seemed changed. There was a busy, bustling tone about it, instead of the accustomed drowsy tranquillity.

Rip looked in vain for the sage Nicholas Vedder, with his broad face, double chin and long pipe, issuing clouds of tobacco-smoke instead of idle speeches; or Van Bummel, the schoolmaster, doling forth the contents of an ancient newspaper. In place of these a lean, pale-looking fellow, with his pockets full of hand-bills, was talking vehemently about the rights of citizens, elections, members of Congress, liberty, Bunker Hill, heroes of Seventy-six, and other words which were a perfect puzzle to the bewildered Van Winkle.

The appearance of Rip, with his long, grizzled beard, his rusty weapon, his uncouth dress, and an army of women and children at his heels, soon attracted the attention of the tavern politicians. They crowded round him, eyeing him from head to foot with great curiosity. The orator bustled up to him, and, draw-

ing him partly aside, inquired on which side he voted. Rip stared in vacant stupidity. Another short but busy little fellow pulled him by the arm, and, rising on tiptoe, inquired in his ear whether he was Federal or Democrat.

Rip was equally at a loss to comprehend the question, when a knowing, self-important old gentleman made his way through the crowd, pushing them to the right and left with his elbows as he passed, and planting himself before Van Winkle, with one hand on his side, the other resting on his cane, his keen eyes penetrating, as it were, into Rip's very soul, demanded, in an austere tone, what brought him to the election with a gun

"Well, who are they? Name them." Rip bethought himself a moment, and inquired: "Where's Nicholas Vedder?"

There was a silence for a little while; everyone looked blank, and then an old man replied in a thin, piping voice: "Nicholas Vedder! Why, he is dead and gone these eighteen years! There was a wooden tombstone in the churchyard that used to tell all about him, but that's rotten and gone, too, and few here remember him."

"Where's Brom Dutcher?"

"Oh, he went off to the army in the beginning of the war! Some say he was killed at the storming of Stony Point; others say he was drowned in a squall at



A troop of children ran at his heels, hooting after him and pointing at his beard.

on his shoulder and a mob at his heels, and whether he meant to breed a riot in the village.

"Alas, gentlemen," cried Rip, somewhat dismayed, "I am a poor, quiet man, a native of the place, and a loyal subject of the king, God bless him!"

Here a general shout burst from the bystanders: "A Tory! A Tory! A spy! A refugee! Away with him!" It was with great difficulty that the self-important man restored order; and having assumed a greater austerity of brow, demanded again of the unknown culprit what he came there for and whom he was seeking. The poor man humbly assured him that he meant no harm, but merely came there in search of some of his neighbors who used to keep about the tavern.

the foot of Antony's Nose. I don't know—he never came back again."

"Where's Van Bummel, the school-master?"

"He went off to the wars, too—was a great militia general, and is now in Congress."

Rip was grieved to hear of these sad changes and grieved to find himself so much alone in the world. Every answer puzzled him, too, by treating of such enormous lapses of time, and of matters which he could not understand—war, Congress, Stony Point. He had no courage to ask after any more friends, but cried out in despair: "Does nobody here know Rip Van Winkle?"

"Oh, Rip Van Winkle!" exclaimed two or three. "Oh, to be sure, that's Rip Van Winkle yonder, leaning against the tree."

Rip looked, and beheld a precise counterpart of himself as he went up the mountain—apparently as lazy, and certainly as ragged. The poor fellow was now completely confounded. He doubted his own identity, and whether he was himself or another man. In the midst of his bewilderment the self-important man demanded who he was, and what was his name.

"Goodness knows!" exclaimed he, at his wits' end. "I'm not myself—I'm somebody else—that's me yonder—no, that's somebody else got into my shoes. I was myself last night, but I fell asleep on the mountain, and they've changed my gun, and stolen my dog, and everything's changed, and I'm changed, and my friends are gone, and I can't tell what my name is or who I am!"

The bystanders now began to look at each other, nod, wink significantly, and tap their fingers against their foreheads. There was a whisper also about securing the gun, and keeping the old fellow from doing mischief, at the very suggestion of which the self-important man retired with some precipitation. At this critical moment a fresh, comely woman pressed through the throng to get a peep at the gray-bearded man. She had a chubby child in her arms, which, frightened at his looks, began to cry.

"Hush, Rip," cried she, "hush, you little dear; the old man won't hurt you."

The name of the child, the air of the mother, the tone of her voice, all awakened a train of recollections in his mind.

"What is your name, my good woman?" asked he.

"Judith Gardenier."

"And your father's name?"

"Ah, poor man, Rip Van Winkle was his name, but it's twenty years since he went away from home with his gun, and never has been heard of since. His dog came home without him; but whether he shot himself, or was carried away by the Indians, nobody can tell. I was then but a little girl."

Rip had but one question more to ask; but he put it with a faltering voice: "Where's your mother?"

"Oh, she died but a very short time since; she broke a blood-vessel in a fit of passion at a New England peddler."

There was a drop of comfort, at least, in this intelligence. The honest man could contain himself no longer. He caught his daughter and her child in his arms and kissed them again and again.

"I am your father!" cried he. "Young Rip Van Winkle once—old Rip Van Winkle now! Does nobody know poor Rip Van Winkle?"

All stood amazed, until an old woman, tottering out from among the crowd, put her hand to her brow, and, peering under it in his face for a moment, exclaimed: "Sure enough, it is Rip Van Winkle; it is himself! Welcome home again, old neighbor! Why, where have you been these twenty long years? We thought you dead."

Rip's story was soon told, for the whole twenty years had been to him



"Alas, gentlemen," cried Rip Van Winkle, "I am a poor, quiet man, a native of the place."



Rip made friends among the rising generation, with whom he grew into favor.

but as one night. The neighbors stared when they heard it; some were seen to wink at each other, and put their tongues in their cheeks.

It was determined, however, to take the opinion of old Peter Vanderdonk on the matter, who was seen slowly advancing up the road. He was a descendant of the historian of that name, who wrote one of the earliest accounts of the province.

Peter was the most ancient inhabitant of the village, and well versed in all the wonderful events and traditions of the neighborhood. He recollected Rip at once, and corroborated his story in the most satisfactory manner. He assured the company that it was a fact, handed down from his ancestor the historian, that the Catskill Mountains had always been haunted by strange beings; that it was affirmed that the great Henry Hudson, the first discoverer of the river and country, kept a kind of vigil there every twenty years with his crew of the ship *Half-moon*, being permitted in this way to revisit the scenes of his enterprise, and keep a guardian eye upon the river and the great city called by his name; and that his father had once seen them in their old Dutch dresses playing at ninepins in a hollow of the mountain; and that he himself had heard, one summer afternoon, the sound of their balls, like distant peals of thunder.

To make a long story short, the company broke up and returned to the more important concerns of the election. Rip's daughter took him home to live with her. She had a snug, well-furnished house, and a stout, cheery farmer for her hus-

band, whom Rip recollected for one of the urchins that used to climb upon his back. As to Rip's son and heir, who was the image of himself, seen leaning against the tree, he was employed to work on the farm, but before long there were signs of a hereditary disposition to attend to anything else but his business.

Rip now resumed his old walks and habits. He soon found many of his former cronies, though all rather the worse for the wear and tear of time, and preferred making friends among the rising generation, with whom he soon grew into great favor.

Having nothing to do at home, and being arrived at that happy age when a man can be idle with impunity, he took his place once more on the bench at the inn door, and was revered as one of the patriarchs of the village.

He used to tell his story to every stranger that arrived at Mr. Doolittle's hotel. He was observed, at first, to vary on some points every time he told it, which was, doubtless, owing to his having so recently awaked. It at last settled down precisely to the tale I have related, and not a man, woman or child in the neighborhood but knew it by heart. Some always pretended to doubt the reality of it, and insisted that Rip had been out of his head, and that this was one point on which he always remained flighty. The old Dutch inhabitants, however, almost universally gave it full credit. Even to this day they never hear a thunderstorm of a summer afternoon about the Catskill but they say Hendrick Hudson and his crew are at their game.

WHEN DID YOU LAST SEE YOUR FATHER?

COLONEL SIDNEY was a Royalist colonel, brave, handsome, gay, and so kind that every peasant adored him. To his little son this splendid Cavalier was something like a god.

When his father had to hide from the Roundheads, and his mother expected every moment to have them searching her castle, the little boy knew that he must say nothing of his father's hiding-place. When the Puritans came and searched for Colonel Sidney, the boy knew that they would question him and that he must save his father. The Puritans gave up the search and retired to the great hall, to which they summoned the ladies.

The boy listened to the questions and

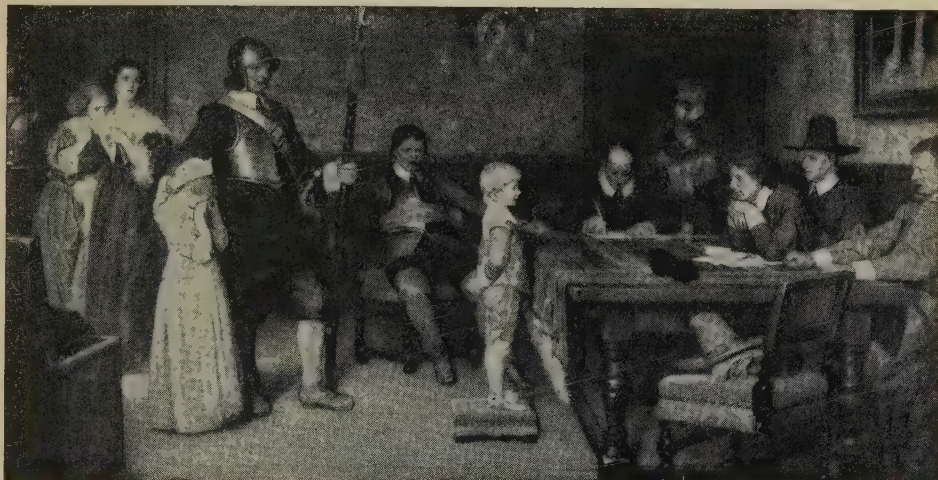
One of the Puritans, leaning toward him, said, in a slow and menacing voice: "The Lord God consumes with everlasting fire those who tell falsehoods, and all those will be punished whom the Lord casts away in His indignation and wrath. Now, listen to me—I ask you, in the name of the Lord God,—When did you last see your father?"

The boy replied in a voice that was steady and firm: "I saw Colonel Sidney last night."

"Last night!" they exclaimed.

"And he told me," continued the boy fearlessly, "to fear God, and honor the king, and love my country."

"Last night?" cried one of the judges. "Then it was in the castle?"



"WHEN DID YOU LAST SEE YOUR FATHER?" ASKED THE PURITAN IN A MENACING VOICE
This picture is by W. F. Yeames, R. A., and is published by permission of the Walker Art Gallery, Liverpool.

answers, and heard his mother tell a lie to save his father's life. Presently one of the Puritans whispered to another, and one rose and spoke to the chief, who glanced at the handsome boy, and said: "Yes, it is good counsel; we will question the little lad at once."

The mother was told to stand on one side, and the boy was summoned and came forward to the table. He stood before his judges, upright, strong and handsome, the image of his father. He appeared quite calm, but his heart was hammering against his ribs, and the palms of his hands were clammy with dread. He had a giant's task on his young soul—not to betray his father and not to tell a lie.

"Yes."

"What part of the castle?"

"I will show you."

They rose excitedly, and the boy led them to a room with a little bed in it.

"It was here," he said.

"Whose room is this?"

"It is mine."

"And your father came to you here last night?"

"Yes, he did."

"Where did he go afterward?"

"I do not know. I was asleep when he came, and I was still sleeping when he went."

"What mean you by that?"

"The last time I saw my father," replied the boy, "was in a dream."

THE NEXT STORIES ARE ON PAGE 4659.

A FAMOUS PICTURE MADE IN MARBLE



This famous picture of St. Mark is made of marble. It is what we call a mosaic, one of the most wonderful triumphs of the artists. The secret of mosaic is the putting together of thousands of tiny pieces of marble or glass of many colors so as to make pictures on patterns. Some of the noblest pictures in the world are in mosaic; there is a picture in St. Peter's at Rome which took ten men nine years to make in this way. The inside of St. Mark's at Venice, where this picture is, is nearly all mosaic, and contains some of the finest pictures in the world, made in marble of natural colors without any paint. There is a mosaic factory at Rome where men copy pictures for churches, and the colored glass they use is said to have 28,000 different shades.

The Book of All Countries



The tomb of Hadrian, which became the fortress of Sant' Angelo.

ITALY AS IT IS

ITALIA, as the Italians themselves call their lovely land, has played a great part in European civilization, and is destined to play a great part in the future.

How is it that a country so small was once mistress of the civilized nations, and has, ever since the age of its domination, given such great gifts to Europe in all the branches of the arts of life?

The answer to this question is manifold, but one important reason for Italy's importance in the ancient and medieval worlds, and in the world of to-day, is undoubtedly her geographical situation. The great civilizations of the Western World have grown up around the Mediterranean. Of that sea the Italian peninsula, with its pendant island of Sicily, is the natural centre. Italy is the natural halting-place, the natural place of exchange, for the merchandise of East and West. The merchants of Venice, Florence and Genoa were the links between the merchants of London, Amsterdam and Hamburg, and those of Constantinople, Asia Minor and India in the Middle Ages.

If Great Britain has captured the keys of the sea, the main line of communication between East and West—

CONTINUED FROM 4413



Victor Emmanuel III.

Gibraltar on the west and Suez on the east—Italy holds the centre and

controls the narrow passage dividing Sicily from African Tunis, though even here Britain has laid her hand on Malta, and has created a great naval station. Italy's wonderful situation is one of the reasons which have made Britain, the greatest of sea-powers, a constant friend of the Italian people. The friendship is essential to the interests of both countries.

Before the World War Italy had strengthened herself in the Mediterranean by establishing herself on the African mainland in Tripoli. After the war she made herself much stronger by extending her Adriatic frontier to include the land on the east of the Gulf of Venice. In this way she took in the naval port of Pola and the old commercial port of Trieste, the outlet for much of the produce of the old Austrian Empire. Then she has made her frontier more secure by pushing it up through Italian-speaking Tyrol, and through a part of German-speaking Tyrol, as far as the Brenner Pass which leads over the Tyrolean Alps from Innsbruck, and has been for centuries the road by which German armies have passed over and down the

valley of the swift Adige to Verona on the Italian plain. By the World War Italy increased her area of 110,632 square miles by 7,550 square miles, and her population of just over 37 millions to nearly 39 millions.

If we look at the map of Italy, we see that the northern frontier of Italy is a vast semicircle made by the great Alpine range, and that it has been extended on the east, so that she has now what the soldiers call a strategical frontier.

THE HIGHWAYS OF TRADE THROUGH ITALY'S MOUNTAIN WALL

Those mighty mountains are the sentinels which guard the rich plains of northern Italy from the armies of Northern Europe. Across them there are passes which have proved possible for armies, but these passes are now pierced by great railways which carry a constant stream of goods, and a constant stream of visitors attracted by the radiant sunlight and color of this lovely country.

And, apart from these physical splendors, Italy has treasures unequaled in Europe, treasures of architecture, of art, of craftsmanship and of a tradition of life. Italian civilization is the mother-civilization of Europe in government, in religion and in the general ordering of everyday life, and everyone who studies European history is drawn in the end to Italy, where he can read its stages onward from the fabled story of the founding of Rome in the eighth century before Christ. That is why every traveler to Italy, even though he goes for some ordinary purpose, such as selling machines, or in search of sunshine, finds himself really a pilgrim.

THE WONDERFUL REALMS IN WHICH THE TRAVELER MAY DWELL

The stranger visiting Italy for the first time looks back into the past. He goes there to turn over the pages of history. He follows the ancient pilgrim's way to Rome, the Eternal City—the Rome of the Cæsars, of St. Peter and St. Paul, the mother-city of European civilization and of Christendom—to walk in the Forum, where Roman history was made, to visit the shrines of the martyrs, or to see and hear the service in St. Peter's, the greatest church in the world.

Or he turns his steps, perhaps, to Pæstum, to visit the four great temples looking down on the Mediterranean, dating from the sixth to the second cen-

tury B.C., unequaled outside Greece itself, and then finds himself in the presence of a civilization which preceded the Romans. Or he may go to Pompeii, where the houses of wealthy Romans have been uncovered so that we can see how they lived, ate and slept; or to Naples, with her incomparable situation, her many memories, her wonderful aquarium and her great museum. He goes to Ravenna, where the Byzantine rulers of Italy held their court, and where Dante sleeps, to see the relics of the darker days of the Roman Empire. Then the traveler must visit the great cities of the Middle Ages and the Renaissance, with their innumerable treasures of architecture, sculpture and painting.

There is Florence, girdled with beauty, the mother-city of a hundred artists; Pisa with the loveliest green place in the world, adorned by an incomparable group of buildings; Genoa the Proud, the great seaport whose houses climb one on top of the other up the steep slope from the sea, city of Columbus and Mazzini; Venice, throned on her hundred isles, "a fairy city of the heart, rising like water-columns from the sea," with her canals lined with the magnificent palaces of those merchant princes who formed the link between East and West; and Milan with her great magnificent cathedral. A score of smaller towns are rich in memories.

A REMARKABLE FACT ABOUT THE MAN-POWER OF ITALY

But we read of the glories of Italy's past elsewhere; here we are to read of Italy as she is to-day.

The Italian people are proud of their splendid monuments, and they do not discard the old ways; but they do look to a new and reconstructed Italy. They think that in the past Italians cared too much for art and music and poetry, and too little for science and industry; and more than ever now Italy has moved forward on modern lines and is on the way to becoming a rich industrial nation. In this she has some advantages. Although she lost half a million dead in the World War, and a million wounded and disabled, she was the only one of the great fighting countries that came out of the war with her man-power increased. This was due to two things—the return of many reservists from foreign countries for war service, and the fact that the young men had to stay at home as there

BEAUTIFUL CITIES OF NORTHERN ITALY



The whole site of Venice is dominated by the main canal, the Grand Canal, which divides the town into two.



The beautiful cascades at Tivoli.



St. Mark's School, Venice, now a hospital.



An old bridge across the Adige at Verona, whose Roman remains surpass those of any other city of northern Italy.

was no opportunity for emigration when the war ended.

Yet Italy suffered heavily in the war, especially in money and goods, and she was not a rich country. Happily, however, after a troubled period of strikes and industrial disturbances verging on revolution, she turned to work more quickly than other countries, and soon became a land full of abounding energy and astonishing vitality, everyone working and working hard, with clear confidence in a great and prosperous future. That is why many Italian people who love liberty and dislike despotism have accepted the dictatorship established by the Fascist party and their leader Signor Mussolini. It is because his government is strongly national, and looks forward instead of backward, because he wants to make Italy strong commercially and politically. Under this revolution—for it is nothing less—political Italy becomes one vast constituency. The voter does not vote for a single local member, but for a party list, and the party which obtains a majority of even one vote is entitled to two-thirds of the seats in Parliament.

THE GARDEN OF EUROPE IN THE SHADOW OF THE HILLS

"All roads lead to Rome," said the proverb. Those roads to-day are iron roads, but they follow the old routes marked out by the northern mountain barrier. We may enter to-day, as in the past, along the narrow strip of the Riviera coast-line between the hills and the sea, by way of Nice and Mentone and San Remo, and so to Genoa. Sheltered from the north winds, this beautiful strip of land is the garden of Europe, gay with flowers, with palms and semitropical trees and fruits. Or we may enter Italy by the Mont Cenis tunnel, descending rapidly to Turin, the centre of a network of railways radiating in all directions. We may travel under the Simplon Pass, from Brigue in the Rhone valley to Domodossola on the southern side, and on to Milan, the principal city of Lombardy; or by the St. Gothard railway in Switzerland to Bellinzona, and on through the olive groves down to the shores of Lake Maggiore or to Lake Lugano and Lake Como; or from the Engadine to the wide Valtellina, the valley which carries the waters of the Adda to Lake Como, and then along the eastern side of the lake to the Italian plains; or, again, over the Brenner Pass

to Bozen, Trent and Verona. All these ways have their own beauty and rare charm.

Once in Italy, the main lines of communication are determined by the shape of the country. Northern Italy—Piedmont, Lombardy and Venetia—forms the valley of the Po, which rises more than six thousand feet above the sea in two small lakes on Mount Viso, sweeps rapidly down to the Piedmontese plain as a mountain torrent, and makes its way across great stretches of unbroken land in the north until it is about twenty-five miles from the Adriatic, when it divides into two main streams, which pass slowly across a wide delta to the sea.

THE MOUNTAINS THAT RUN THROUGH ITALY LIKE A BACKBONE

On its way it receives the waters of many rivers coming down the valleys from the high Alps on its left or from the Apennines on its right. The other great river of the northern plain is the Adige, along which the old road from the Brenner Pass comes down to Verona. The Adige looks as if it would also join the Po, but it makes a sharp turn to the east and enters the Adriatic a little to the north.

The other communications in Italy are determined by the Apennines, running like a backbone down the country and ending in the "toe of the boot" in Calabria. The eastern plain is narrow, the rivers swift, and there are no good harbors except those of Ancona and the modern port of Bari. On the west the slope is rather wider, and there are two considerable rivers, the Arno flowing past Arezzo, Florence and Pisa to the sea, and the Tiber, on whose banks Rome is built. The west coast is rich in good harbors—Genoa, Leghorn and Naples; and on the northern coast of Sicily stands Palermo.

THE ACTIVE VOLCANOES WHICH SPREAD FIRE AND DESTRUCTION FOR MILES

A considerable section of the mountain-system of Italy is volcanic, and the volcanoes of Sicily (Mount Etna) and of Campania (Mount Vesuvius) are still active. Etna has dealt terrible destruction on the villages clustering around her in our own day. The first eruption of Vesuvius of which we have any record took place in A.D. 79, when Herculaneum and Pompeii were overwhelmed, and the mountain has been active, and at intervals violently so, ever since. Other cones

ITALY, LAND OF SUNSHINE AND FLOWERS



Italy has the curious appearance of a man's leg and foot about to kick Sicily through the Straits of Gibraltar into the Atlantic. The country is very mountainous, for down the middle run the tree-clad Apennines, and in the north the towering Alps act as a protecting barrier against invaders. Hannibal and Napoleon, however, found the Alps no bar to their conquering progress. When Austria ruled in Italy, an Austrian statesman said that Italy was merely "a geographical expression," meaning that this country united under one sovereign and one government was unthinkable. But half a century later the apparently impossible was realized, and Italy is now one country not only geographically, but one in thought and action.

in the same district give forth steam and gases, but some have been silent for ages, and the craters are turned into lakes around which all sorts of legends have gathered.

The map of Italy shows us that but for the rich and level valley of the Po, which at one time appears to have been covered by the sea, Italy is a mountainous and rugged country, but the soil is rich from the age-long practice of good farming. The people are not content with cultivating the plain; they have terraced the sides of the mountains as the Incas did in Peru, and it is extraordinary to find these terraces held up by stone walls. The climate varies very much in different parts of the country according to the lie of the mountains. Italy in summer is extremely hot, especially in the south; but on the northern plains cold winds sweep down from the mountains in winter, and the winter temperature of Turin is actually lower than that of Copenhagen. In the highlands of middle Italy there is a long winter, and wolves are not unknown. Snow lies on the ground for weeks in places where the warm Mediterranean winds are shut out by the mountains.

THE GREAT RANGE OF PLANTS GROWING ON THE HILLS AND PLAINS

This variation in climate explains how it is that semitropical plants—and even cotton, rice and cane-sugar—are grown in some parts of Italy, while in the north the olive grows only in sheltered places. On the high slopes of the mountains there are pine forests; as they sink to the plain there are groves of chestnut and of olive. The ilex and the cypress are other familiar trees which give a charm to the landscape. In some parts of the country chestnuts form an important part of the food supply, and the olive in certain districts yields the best oil in the world. Another tree valuable in the Italian economy is the mulberry, whose leaves feed the silkworm. But it is difficult to compete with the raw silk of the Chinese and the Japanese, because in those countries the leaves are stripped three times a year from the trees which are grown in the form of bushes and not as in Italy.

On the lower slopes of the hills the vine is grown, not in neat rows as in France and Germany, but twining up pollarded trees, oak and elm, or climbing high on poles. Wheat, olives, wine, cheese have been the staple foods of the Italian people

from time immemorial. Macaroni, which is a favorite food, is made from wheat. Wheat, rye, millet, maize, potatoes and turnips are important crops. Two specially important industrial crops are tobacco, which is a state monopoly, and hemp. The farmers also grow a multitude of green crops for their cattle, horses and sheep. Goats are everywhere in Italy, and it is said that they spoil the forests by nibbling the young trees.

Italy has always, even in Roman days, been compelled to import wheat, and before the World War she obtained it chiefly from Rumania and Russia. She is again beginning to receive it from those sources.

THE PLOW DRAWN BY OXEN AS IN THE GREAT DAYS OF ROME

Fruit-growing is an important industry, especially in the south. In addition to groves of oranges and lemons there are orchards of cherries, apricots, peaches, apples and pears, which make the Italian spring and fruit seasons very beautiful. Almonds, walnuts, filberts, pistachio nuts and figs are also grown.

In northern Italy the farmers are very up to date, with all manner of new machines, but in the wilder districts of the centre and the south the oxen still bear the yoke, and drag a primitive plow, just such a one as Cincinnatus may have used twenty-five hundred years ago.

Italy still has nine million people—more than a fifth of all her people—engaged in agriculture. It seems odd to count among the agricultural workers children of ten, but school hours are over early in the day; and in remoter districts all work in the fields—men, women and children—the younger children looking after the goats, helping with the cattle, and so on. Italy is a southern country, where the children grow up early and very soon take their places in the work of life.

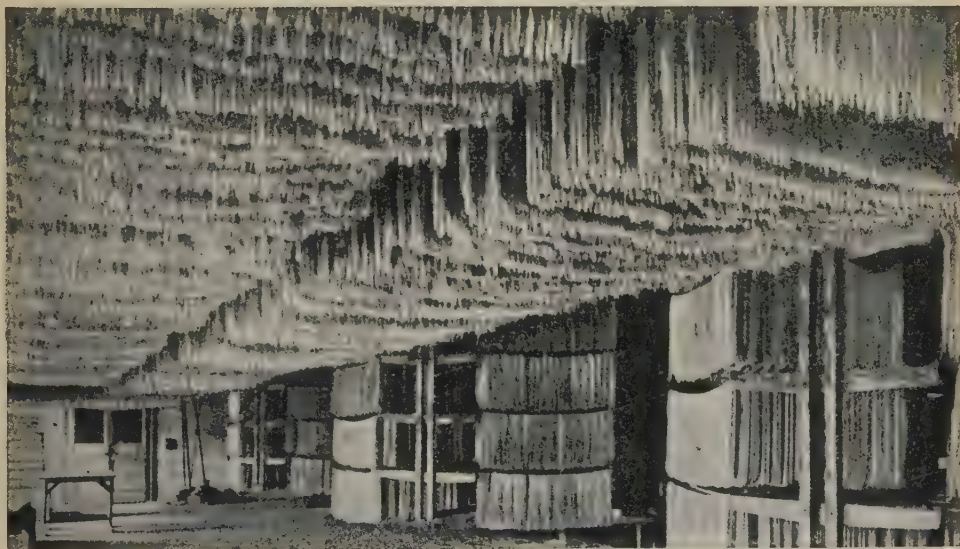
THE MULTITUDE OF PEOPLE THAT LEFT ITALY IN THE DAYS BEFORE THE WAR

Until our time Italy has been a poor country, as agricultural countries usually are. The country is small, and much of it is rock and mountain; and Italy's sons have emigrated in vast numbers. Before the World War 650,000 Italians left their country every year, so that there is outside Italy to-day, chiefly in America, an Italian population of seven millions. Many of them return when they have made their fortunes, and they send home

THREE GREAT INDUSTRIES OF ITALY



Alabaster is largely worked, by means of underground galleries, in the district of Volterra.



Macaroni is dried by hanging it over wooden rods in stoves or heated apartments through which currents of air are driven.



Clever craftsmen of Lombardy at work on beautiful marble mosaics. Italy has many lovely mosaics in her churches.

from the country of their exile considerable sums of money to their friends and relatives.

The reason why Italy has been poor, and has had few industries on a great scale, is that she has no hard coal, though there is a certain amount of lignite, or brown soft coal. Since the World War this has been a very serious matter. Italy has always had supplies of cheap English coal, but English coal since the war has been very dear, and the low exchange value of the Italian lira made buying still more difficult. Italy could not buy for her railways and her industries, and her locomotives were built to burn good English coal. Before the war she imported every year nine million tons of coal to supply her busy factories. But New Italy is ingenious and determined. Her scientific men have realized that, even though she has no black coal, she has "white coal." That white coal is the power locked up in the hundreds of mountain torrents and rivers which are wasting their energy as they tumble down the steep slopes of the Alps and the Apennines. These are being banked up in great reservoirs, and giant turbines are being installed to turn their pent-up energy into electric power for the factories and the railways, though it will always be necessary to import a certain amount of coal.

THE TREMENDOUS WATER-POWER THAT IS WAITING TO BE USED

The horse-power available for use from the rivers and lakes of Italy is 55 for each square mile of surface, whereas in France it is only 27, and in England 11. The first electric station run by water-power in Italy was built in 1892, and the electrification of the railways has already begun. There are now about forty great reservoirs in the Alpine region, and four in Sardinia. Others are being built in the Alps, the Apennines and in Sicily.

Italian engineers have a vision of a single network of transmission lines which will carry power of all sorts to every town, village and factory. The advantage of this single network would be that the Italians could use the water from the Alps, which is at its highest when the snows begin to melt, and in autumn and winter could make use of the swollen waters of the centre and south. The engineers have constructed great irrigation works to improve lands which before produced scanty

crops, and much marsh land has been reclaimed, notably on the Ravenna, Roman and Tuscan marshes, in the delta of the river Po, and in the neighborhood of Venice. The great navigable canal which is being constructed between Venice, Milan and Lake Maggiore; the huge breakwaters at Genoa and Naples; the mountain railways, the cable ways in the mountains which will carry goods and sometimes passengers up to the highest points and across dangerous ravines, give us some idea of the enterprise and skill of the engineers who are carrying on the great traditions of ancient Rome.

Side by side with the quiet country life which has gone on through the ages is this new industrial Italy, determined to be in the front rank of science and industry.

ITALY TAKING HER PLACE AMONG THE GREAT INDUSTRIAL NATIONS

In eight years before the World War Italy doubled the value of her buildings; in two years after the war her merchant marine was doubled, partly by the addition of ships handed over by Austria under the peace treaty. Ever since the beginning of the century she has been forging ahead. New buildings and new factories have sprung up everywhere. Her great ports, Trieste, Genoa, Venice, Naples, Palermo and Bari, are all being enlarged. Venice is to develop a big trade with the eastern Mediterranean, and a great harbor is being built there with a separate port for the oil-tankers which bring oil from all parts of the world, and with two square miles for industrial yards and factories, the workers being housed in a garden city. Palermo, where the little painted carts have quaint pictures on them, is become a great port for ocean-going ships plying between Italy and New York and Buenos Aires.

At one time the chief industries of Italy were all in Lombardy and Piedmont. They make textiles, cottons, woollens and silks, but there is now a great mechanical industry, especially in motor cars and airplanes. The Fiat motor-car works in Turin are among the greatest in the world. In two natural products Italy has a practical monopoly. She has the principal alabaster mines in the world, and the marble quarries of Carrara are unique. The only European supply of sulphur is obtained from Sicily.

In what may be called the artistic industries Italy has always held a high

INTERESTING CITIES OF ITALY



The city of Padua is picturesque, with arcaded streets, and many bridges crossing the various branches of the Bacchiglione.



The campanile at Palermo.



A street in Naples.



Ravenna is connected with the sea by the Corsini Canal, at the mouth of which is a small harbor, Porto Corsini.

place. Art is native and traditional there. The Italian craftsman to-day is the heir of a long line of artist craftsmen in sculpture, in mosaic work, in pottery, in silver work, in glass, in iron, in embroidery and in a score of other industries. And to-day, as in Japan, there are many men who work alone, or with one or two assistants, developing their own patterns and their own artistic ideas, but working more or less on traditional lines. Most of us who have been to great museums have seen the

The Italians are a Latin race, and their language comes directly from Latin, though a Latin so softened and modified that it has lost its complicated endings and its formal grammatical construction. It was regarded in the twelfth century as "Vulgar Latin," but Dante wrote his Divine Comedy in it, and Europe recognized that Italian was not merely a popular dialect, but one of the most flexible and musical languages in the world. From that day Italian literature was closely



Shipping on a canal at Trieste.

wonderful majolica, enamel, and glass and silver work of the Italian Renaissance, the work of such artists as Benvenuto Cellini. That work goes on. Some of the well-known centres are: for alabaster, Volterra and Florence; for pottery, Florence, Faenza and Pesaro; for wrought iron, Siena, Florence, Turin, Venice and many other places; for lace, Venice, Florence, Como and Santa Margherita, as well as Sicily and Sardinia; for glass and beads, Venice; for statuary and straw-plaiting, the towns of Tuscany; for mosaic work, Venice and Florence.

studied, and English writers, from Chaucer onward, went to it for guidance and for stimulus. Chaucer took his tales from Boccaccio; Spenser took his from the Italian romance-writers; Shakespeare went to the Italian treasure-house for many of his plots, and some of his contemporaries took the manner as well as the matter. Shelley sought refuge for his great spirit in Italy, and found his greatest inspiration there; there Keats died, and there a multitude of poets and writers, the Brownings among them, have found new homes from time to time.

EVERYDAY SCENES IN SUNNY ITALY



For centuries Carrara has been famed for its wonderful marble, tons of which here await dispatch.



Cattle drag the marble from quarries to the railway. The world's finest statues are of Carrara marble.



Sicily, the island that lies at the toe of Italy, has had a famous history. Its people now are poor and uneducated. They have quaint customs, one of which is to decorate their carts with paintings.



Pisa still retains its ancient walls. Besides its fine Cathedral, baptistery and famous leaning tower, it has several notable churches.

Two upper photographs copyrighted by Underwood & Underwood, New York.

English and French writers, artists and musicians, turned to Italy for their models and their inspiration in the fifteenth and sixteenth centuries; in the seventeenth century English architects went to Italy for their models, and Sir Christopher Wren built his London churches in the Italian style.

The Italian people are, it is true, descendants of the Romans, but the type varies very much. In Lombardy and the north, the tall, fair Goths of the north settled, and have left an abiding impression on the race. The home provinces of the Roman Empire suffered a series of invasions which have left their mark. In Sicily and the south, waves of invasion and occupation have left a mixed race.

THE VARIED TYPES OF PEOPLE IN THE PROVINCES OF ITALY

The people of northern and central Italy are industrious, educated and orderly; the people of the south, misgoverned by foreign masters until little more than half a century ago, naturally more hot-blooded and turbulent, are more backward in education, more superstitious, less industrious, and still subject to the fierce hatreds which find their expression in what is called the vendetta. The purest Roman type is to be found in Rome and Tuscany—dark eyes and dark hair, with the regular and beautiful features familiar to us in the masterpieces of Italian art. The Roman loved law and politics and the public discussion of them; his home life was based on the ideal that the father is master of the house, and that it is his business to rule it with even, but stern, justice. This is the same to-day. The Romans gave law, roads and fine cities to Europe, and to-day the Italians are great engineers.

There have always been some peoples in Italy who do not speak the Italian language—Albanians in Calabria and Sicily, French in the valley of Aosta, Greeks in the south, and Catalans in Sardinia. The newly annexed territories have a population mainly Italian, but in the upper valley of the Adige toward the Brenner Pass, there are over two hundred thousand Germans, and in eastern Istria about half a million Croats and Slovenes. Italy's age-long division into different states, some of them under foreign rule, has helped to intensify the differences of race, which, however, become less every year, as communications improve.

The Italians are naturally a religious people. Their Catholicism is rather different in spirit from that of any other nation. They have brought into it their local genius and perhaps something of earlier faith. In any case, it is more intimate and more traditional than in other countries. Devotion centres round the Madonna and Child, the Madonna as we see her in Italian pictures, sometimes anxious and thoughtful, sometimes intellectual, sometimes gay, but always an Italian mother. Jesus is always an Italian boy, round and dimpled, and it is quite natural that his cradle should be in the Church at Christmas, and that everyone should go there to do him homage; that his picture should be in every house, and lighted on festal occasions with a candle. He is the centre of the home.

THE FLOURISHING TOWNS WHICH ARE BUILDING UP ITALY'S TRADE

Naples, with her wonderful natural harbor and her population of 780,000, has still the greatest shipping trade of all Italian ports, but Palermo and Trieste are rapidly gaining on her. Milan and Turin are the greatest Italian manufacturing centres for textiles, metal-works, motor-building, and many other branches of engineering; Milan is now the greater railway centre.

The busy manufacturing towns of Lombardy and Piedmont import and export through Genoa to the west and through Venice to the east. Catania, in Sicily, is the centre of the trade in sulphur, of which Italy had a practical monopoly until the United States stepped in. Trieste is the natural outlet for the trade of Austria; Messina, seated on the narrow strait between Italy and Sicily, has suffered terribly in the present century from earthquakes. Bari is a growing industrial port for European and Levantine trade; Leghorn is the port for Florence and the outlet for the industries of Tuscany; Padua, which claims to be older than Rome, was a famous medieval seat of learning and is now a great industrial town of Venetia. Ferrara, Brescia and Verona are flourishing modern towns.

Modern Italy is indeed a new country; she is the scene to-day of an awakening of industry and commerce as marked as the awakening of art and learning in the fifteenth century; and she has the good-will of all nations as she marches hopefully on.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 4679.



The town of Brescia, where Bayard died in defending a castle against the Spaniards.

THE MAN WHO KNEW NO FEAR

TOWARD the end of the fifteenth century there was a pretty sight to be seen one day before an old and noble castle in France, the Castle Bayard. The old Lord Bayard, who had been wounded in battle, stood leaning on his two sticks, with his beautiful wife at his side. He was surrounded by a great court of attendants. The eyes of the old warrior shone with affection and admiration. All the attendants were clapping their hands.

And the cause of their delight was a boy fourteen years of age, who, dressed in silk and velvet, and with a feather in his cap, was making his little horse perform.

The wounded and crippled lord could not train his son for knighthood; so the little horse had been bought, the gorgeous dress had been made, and Pierre was going forth to learn the business of a soldier at the court of the Duke of Savoy.

In this service the boy distinguished himself by his courage and skill, and gained the affection of everybody by his simple and generous disposition.

One day the duke wanted to send a magnificent gift to the king of France, and it occurred to him that he should send this brave page.

So it came about that the French king was one day in the midst of his court when Pierre, on his little horse, made his appearance, sitting so beauti-

CONTINUED FROM 4226



fully and making his horse obey so easily that it was a pleasure to watch.

"Piquey! Piquey! Spur again!" cried the king, clapping his hands. And all the court cried, "Piquey! Piquey!"

So Pierre went cantering round the field again, and everybody shouted his praise of the boy's horsemanship.

We must hurry over all the brave things done by this fearless boy, for they would fill many volumes, and look upon another scene, when Pierre is a man. He is tall, straight, bright-eyed and gracious. He has overthrown the bravest knights; he has won the highest honors on the most desperate battlefields; his name has become a wonder to all mankind. He is called the "knight without fear and without reproach." Everybody has heard of him; everybody knows how dauntless is his courage, how generous he is to fallen foes, how chivalrous to women, how brave a knight, how noble a Christian.

And now this is the scene. A great battle has been fought, and the new king of France, a mere boy, is riding out of his first fight, flushed with the pride of victory. One thing he desires: to be knighted. This great king longs to be created a brave knight. But who can do it? Is not he himself the power who creates knights?

Well, that evening before the king's tent a wondrous sight was seen. The

bravest soldiers of France made a great square before the tent, flags were flying, and the heralds blew their trumpets. Those who were to receive honor at the king's hands gathered in front, full of excitement. Everybody was waiting with pleasure for the ceremony. Then from his tent came the king. He walked to where Bayard stood, knelt on the grass before him, and Bayard, laying a sword upon the king's shoulder, created Francis I

an eagle. He feared to meet no foe. He rode like a whirlwind to succor the weak. He crushed the power of tyrants. But in peace he was gentle. In war, an eagle; in peace, a dove. He was in truth "*le chevalier sans peur et sans reproche*."

Bayard met his death, which was worthy of his whole life, while with a handful of men he was holding back the Spaniards from pursuing the French Army, which was retreating from a diffi-



The death of Bayard, after holding the Spanish in check with a handful of men.

a knight. The king had chosen the bravest and most courteous knight to raise him to the honor of knighthood.

One of the great exploits of this splendid Bayard was to defend a castle at Brescia against an overwhelming body of troops. When the queen of those troops asked her general angrily how it was he could not take, with all his men and guns, "a crazy pigeon-house," the general answered, "Because, madam, there was an eagle in it."

That was Bayard's character in war:

cult position. During the fight he was struck by a ball. His sorrowing companions lifted him from his horse, and propping him against a tree, tried to aid him. But feeling that he was mortally wounded, he raised the cross of his sword-hilt to his lips and breathed a prayer. Then he bade his followers turn his face to the foe, and leaving him there, themselves ride on to safety. We need not say that his friends refused to leave him to die alone, but stayed beside him until he breathed his last.



KATE BARLASS OF THE BROKEN ARM

KING JAMES I of Scotland was a good king; but when he came to the throne, nearly five hundred years ago, the country was in great disorder. As a boy on his way to France, James had been captured by English sailors who had sent him to the English king Henry IV. After a long imprisonment he returned to Scotland, which in the meantime had been governed by a regent. James soon found that he had to be very stern and severe to keep the powerful nobles from wrongdoing. Some were imprisoned; some were put to death; and some had to give up their lands; therefore many of them were full of hatred toward him. Then certain of these, headed by Sir Robert Grahame, conspired together to slay the king.

Now, it happened that the king went one winter to the town of Perth to hold high festival, with his queen and some of her ladies, and abode in the Abbey of Perth, while his followers were scattered over the city; and here the traitors got their chance of catching him unguarded. To make matters easier, some servants were bribed to remove the bolts and bars from the doors.

And so, before long, it befell one night, when all the king's men had gone from the abbey, and he was sitting unarmed with the queen and her ladies, that a great clatter of weapons was heard without. Thereupon he guessed that his foes had gathered to murder him, nor could he fight them, being himself unarmed. But there was a vault under the chamber, and he wrenched up boards from the floor and leaped down. The ladies quickly put back the boards and covered them before the traitors rushed into the room.

And they, not finding him, searched

for him high and low. Then the king and the ladies in the chamber, seeing that the danger was passed, began to move the boards, so that James might come out again. And, even at that moment, they heard the clatter and clash of arms again. For one of the traitors had bethought himself of that vault, and they were hurrying back.

What chance of escape from death was there for the king? There would be no time to cover all up before the conspirators broke in; and on the door was no lock or bolt to stay them—only the iron rings where the bolt should be.

Quick as thought, one of the queen's maidens named Katherine Douglas sprang to the door and thrust her arm through the rings on the door, crying out that the men must not enter, since there were none in the room but ladies who were disrobing. But the fierce men outside paid no heed to that, and beat upon the door; and how should a maiden's frail arm suffice for a bolt against their battering? Alas, poor Katherine's arm was snapped, and the wicked men burst in, and, seeing where the floor had been disturbed, leaped down and slew the king.

For that brave deed, vain though it was, men called her Kate Barlass and her descendants made Barlass their family name instead of Douglas. The noble family of Barlass still survives in Scotland. On their crest you will find a broken arm.

The act was one of instant decision, planned in a flash as Kate's quick wit saw the need; but it had behind it a quality which is pictured in the old word "grit." The dictionary will tell you that among other things this means "firmness, pluck, indomitable courage, resolution."

THE BRAVE DEED OF A YOUNG AMERICAN DOCTOR

AMONG the hills of Greece a terrible battle was waging between the Greeks and the Turks. For hours the rifles had cracked and the sabres flashed. The dead and wounded lay heaped under foot. A cloud of smoke hung heavy over the battlefield. The air was rent with battle-cries, and through all could be heard the moans of the wounded.

At the forefront of the Grecian battle-line a young man on a black charger dashed hither and thither, urging the soldiers on with his cries—his own blade doing valiant work. Before the oncoming horde of turbaned Turks the Greek line wavered and broke.

"What! Cowards! Would you fly before the dastard Turk!" hoarsely shouted the young man on the black horse, flourishing his sword. "Rally to the flag, men, rally to the flag!"

But his words were swallowed up in the din of the enemy. The Greeks were flying. Pressed upon by the foe, the young man was obliged to turn and follow his retreating comrades. He found himself riding by the side of a young Greek soldier—their horses were straining neck and neck to outstrip the merciless foes who shrieked behind. One of the foremost Turks caught up with them for a moment. There was a flash of steel through the air, and the young man dimly noted that the tunic of his companion was red and wet.

"Lie low on your saddle!" he cried hoarsely, as the bullets whistled about their heads. Suddenly he saw the Greek boy reel and slip from his horse. With a tremendous wrench he brought his horse to a standstill and leaped to the ground. Reaching down, he caught up the wounded Greek, but the Turks were upon him. He fought them off, sword clanging against sword, and flung himself upon his plunging horse, dragging the boy up with him. The blood spurted from his wounds, but he clung to the saddle, the limp body in his arms, and leaning

low over his horse's neck, urged him furiously on. The horse, frothing and snorting with terror, tore over the ground, and the Turks, bereft of their prey, howled behind. The breath from their horses' nostrils scorched the young man's legs.

Then with one last spurt his great black horse surged ahead and plunged into the torrent whose opposite shore meant safety. The bullets spit and whistled through the air. One grazed the young man's arm; another clipped a curl from his dark head. But the opposite shore was reached at last. Panting and reeking with foam, the horse scrambled up the slippery bank. Wheeling about, the young man waved his hand in derision at the swearing Turks upon the opposite shore, and turning, plunged into the forest upon the mountainside, the rescued soldier lying across his saddle bow.

The man who performed this noble deed was Samuel G. Howe, a young American surgeon who had joined the Greeks in their brave struggle for independence from the power of Turkey. Terrible in the fight, the same hand was as gentle and skillful as a woman's in helping the sick and wounded. Everywhere he went he established hospitals for the suffering soldiers, and when matters grew desperate and the Greeks were dying around him on every side from starvation, he hurried home to America to procure aid. Through the newspapers, by thrilling speeches and personal appeals, he obtained money for the help of his comrades, and returned to Greece in a ship laden with generous offerings from the American people, who were glad to help the cause of freedom.

How the Greeks blessed the man and the nation who had been so generous to them! And when the war was over, and they had won their freedom from the cruel power of Turkey, they sent a vote of thanks to the brave young American doctor who had helped them so nobly in the hour of their great need.



THE QUEEN WHO GAVE UP HER BOY

NEAR the beginning of the sixteenth century there was born at Fontainebleau, in France, a little girl, Jeanne d'Albret, heiress to the kingdom of Navarre and niece to the French king Francis I. She hardly knew her parents, but was brought up in the country by her governess, and until she was nine years of age did not realize that she was kept a prisoner by her uncle, King Francis, in a castle on the banks of the Loire. This the king did that when she was quite a child he might compel her to marry a Protestant duke. Little Jeanne was very unwilling to marry the duke the king chose, and was glad when the pope annulled the marriage and she was free to wed as she chose.

During the peaceful years she spent at Pau Jeanne studied and learned to love the religion of the Huguenots, the persecuted Protestants of France, and devoted herself to their cause. On the death of her old father she became queen of Navarre, and while dark clouds were gathering round the heads of the Huguenots she helped and encouraged them all she could.

The homeless and persecuted were ever welcome at her court, which grew to be looked on as a haven of refuge by the sorely troubled Huguenots. When their

leader the Prince of Condé fell in the disastrous battle of Jarnac in 1569, and hope seemed dead, the faithful queen of Navarre came to their aid. She rode into camp among the despondent soldiers, bringing with her two fine bright boys—her only son Henry, aged about fifteen, and his cousin, the now fatherless Prince of Condé, a boy of twelve, whom she had adopted. In stirring words she rallied the little army to defend their religion and to avenge the death of their beloved Condé. Presenting the two boys, she cried: "Soldiers, I offer you everything I have—my kingdom, my treasures, my life and, more precious than all, my children."

These words were received in breathless silence, and then, as Prince Henry galloped into their midst, the soldiers greeted him with cheers as their leader. In clear, ringing tones he swore never to desert them.

Dark days were before the Huguenots, and to them the sacrifice of the queen of Navarre may have seemed vain in the gloom of after-events; yet who shall say that it was so, when her noble deed revived the courage of the Huguenots at a time of defeat? Later her son became king of France and relieved the Huguenots of some of their burdens.

THE BOY WHO WOULD NOT FIGHT AGAINST FREEDOM

HERE is the story of a young Italian who well deserves to be called a hero, though no one even knows his name. In the middle of the last century there was no kingdom of Italy as there is now. The southern part was the kingdom of Naples, where the king was a foreigner, and the government was very harsh. Most of the northern half was under the rule of the Austrian emperor; and the Italians hated, as much as we should do, to feel that they were held under a foreign yoke, and the peasants rose in arms to win their freedom. They succeeded after a long struggle; and the first king of United Italy was Victor Emmanuel.

Now, the Austrians sent troops into Italy to crush the rebels. They also compelled many Italian peasants to join Austrian regiments which were engaged in preventing the people of Italy from winning their liberty. The peasants could

not resist; they could only do their best, at great risk to themselves, to give what aid they could to the bands of insurgents. If they were dragged off into the Austrian ranks, they were obliged to fight against their own countrymen to save their own lives.

But there was a young lad among those who were thus forced to carry arms against the Italian patriots, and he resolved that it was better to face death than to help in an evil cause. He could not resist the Austrians, but even in self-defense he would not fight against the liberators. And so, when his first battle was over, he was found slain by a bullet, with a smile on his face, holding the musket in his dead fingers.

But the musket had never been loaded. He gave his life for Italy without even fighting to save it.

THE NEXT STORY OF GOLDEN DEEDS IS ON PAGE 5119.

ROME'S FINE STATUE OF GARIBALDI

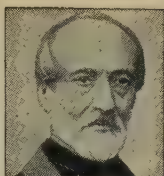


Garibaldi, as he sits on his hilltop looking down on Rome. This was the man who, though wounded at the start of a fight, could sit the whole day afterward in his saddle. He could share with his king the honor of a triumphal entry, then withdraw to live simply and quietly on his island farm. To liberty and to Italy he gave the devoted service of his life—a life which is a romantic chapter in the world's history.

The Book of MEN AND WOMEN



Miltiades.



Mazzini.



Andreas Hofer.



Kossuth.



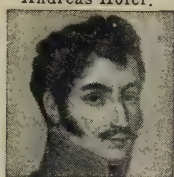
Themistocles.



King Alfred.



Garibaldi.



Bolivar.



William Wallace.



Boadicea.

DEFENDERS OF LIBERTY

WHO does not love the story of that ruddy shepherd lad, the youngest in a family of eight sons, who went into the camp of Saul, king of Israel, to carry loaves and cheeses to his brothers and their captain? You remember how he found the army drawn up on a mountainside, facing the army of the foe—the Philistines, who were drawn up on the opposite mountainside—and how the gigantic champion of the Philistines, brandishing his spear, which was “like a weaver’s beam,” called out his taunting challenge to the Israelites across the valley.

Is there a more thrilling moment in history or in fiction than that when David, having put aside the king’s own armor, stepped down to the brook, staff and sling in hand, and chose his ammunition—five smooth stones—then faced his disdainful antagonist Goliath of Gath, “whose height was six cubits and a span”? Splendid in massive armor of brass stood the giant Philistine. Strong in his faith in the God of the armies of Israel stood the young champion, just come from tending his father’s sheep. Forward he ran; out flung the stone from his sling; and down crashed the heavy sword from the lifeless hand of the smitten Goliath. So David prevailed “with a sling and with a stone.” The armies of Saul rushed upon the armies of the Philistines, and there was

CONTINUED FROM 4440



victory in the tents of Israel.

Every age has its Goliaths—single Goliaths and communities of Goliaths. It is only when the challenge of Goliath is answered by an enlightened and valiant

David that the grinding tyranny of the giants is defeated and mankind is permitted to struggle a few steps toward the distant goal of perfection. The history of mankind could be written around these heroic souls who have withstood wrong, who have died for freedom or—sometimes a harder thing—lived for it.

Among the early records of history shines the example of two men who helped to save the world for liberty and learning, about five centuries after David and five centuries before the birth of Jesus. The empire of the Medes and Persians—an empire founded upon pitiless might, upon superstition and the folly which accompanies blind brute power—was aiming at the mastery of Europe.

The little nation of Greece lay across the path, forming a military barrier. Worse still, she was a danger to all that held the intolerable Persian Empire together; for independent thought traveled from Greece into the realms of King Darius—thoughts of culture and human rights and liberties. Therefore, Greece must be crushed.

So a great army of those formidable

Medes and Persians of whom the Bible tells us marched into Greece, and drew up on the plain of Marathon near Athens. No nobler picture exists than that of the devoted little Greek nation facing this Eastern Goliath. The hour brought the man. Miltiades was undismayed. He counseled, exhorted, directed. Under his leadership the little David nation attacked its dreadful giant foe. Greece could not have had more than 10,000 fighting men all told, but at the battle of Marathon, in 490 B.C., she overthrew more than 50,000 men who had come to trample out her life.

The peril was not yet ended. The enemy slowly re-armed. Themistocles, who had fought under Miltiades, foresaw with wonderful inner vision that the next battle would occur at sea. By ten years of teaching and preaching he overcame furious opposition, got a fleet organized and was ready when King Xerxes, successor to Darius, brought his hosts against the devoted land.

THE BATTLE OF SALAMIS, WHICH SAVED THE WEST FROM THE EAST

The battle of Salamis was the battle of Themistocles. In name, a Spartan general commanded the united forces of Greece and Sparta, but Themistocles was the guiding spirit. His allies proposed to retreat and leave their land to be overrun. Themistocles knew that this would be fatal to Greece, so he planned an audacious trick. In some way he contrived that Xerxes should get a message indicating that the Greeks were about to flee. Consequently, during the night Xerxes moved his forces into the bay, and in the morning the Greeks found their ships surrounded. They had to fight then and there, as Themistocles desired; and, put to the test, they won an overwhelming victory, as his confident spirit had foreseen that they would.

After twenty-four centuries we still recognize that Miltiades and Themistocles at Marathon and Salamis saved the world. The supremacy of the West was established in that vital contest with the silken barbarism, the luxurious tyranny of the East. Had Greece fallen, the story of the world would have been entirely and fatally different.

Miltiades and Themistocles, although they have all posterity in their debt, suffered the fate not uncommon to heroism. Miltiades perished in the prison into

which his ungenerous countrymen flung him. Themistocles met death as a fugitive, banished by the people he had saved from bondage and destruction.

THE LITTLE ARMY THAT ROUTED THE GREAT HOSTS

The saviors of a cause may die that a people or a principle may live, and in their death may be the seeds of victory. An illustration occurs in Jewish history. A mighty kingdom had arisen in Syria, and one of its kings, named Antiochus, who ruled over Palestine as a part of Syria, not quite two hundred years before Jesus lived, resolved to make the Jews give up worshiping God according to the Hebrew law. He wished them to offer sacrifice to the gods. Then there arose Mattathias, who, with his sons, refused to obey the orders of King Antiochus. Among the sons of Mattathias the most skillful warrior was the second, whose name was Judas, surnamed Maccabæus, which means "Hammer."

Judas gathered together a troop of Jews who were ready to die for faith and freedom; and though they were few in number, yet they routed utterly great hosts which the king of Syria sent to subdue them, and won back Jerusalem from his soldiers.

When men saw this small band making havoc of vast armies, they gathered to follow Maccabæus, nor could the Syrian generals in any way subdue them. And though Judas himself was at last slain in a battle, where his followers were so few that they were overwhelmed by the numbers of the enemy, yet it was indeed he who at that time won freedom for the Jewish people.

BOADICEA AND HER FIERCE FIGHT FOR FREEDOM AGAINST THE ROMANS

In the history of England we can trace how the torch of liberty has passed through many hands, but none fiercer than those of Boadicea. She was a queen of the Iceni in what is now Norfolk and Suffolk, in the eastern part of the island. Her husband had died a king, with the understanding that his widow and heirs should inherit his kingdom.

The Roman rulers, however, proved faithless. They annexed the little kingdom, and treated Boadicea like a serf. When she protested, she was publicly scourged, and her two lovely daughters were submitted to treatment which almost broke her heart. But it did not break;

instead, it caught fire. Boadicea raised an army of Britons, and fell upon the Romans and upon all Britons friendly to them. The slaughter was horrible, in keeping with the pagan times, for the rebellion occurred in A.D. 60. In the end Boadicea was defeated. She died, like Cleopatra, by her own hand. She was a tigress in her hour of trial, and met barbarism with savagery, the only kind of return known to her age. But the ago-

zens. As we look forward in the history of England a figure beckons us to one of the finest stories in its annals. Alfred the Great stands out among the noblest souls that ever graced any land. He had all the fiery courage of Boadicea, but refined by a beauty of spirit such as comes to mankind but once in a millennium. He was born in 849 into an England where practically all the land north of the Thames was in possession of the ferocious



MR. HAMO THORNYCROFT'S FINE STATUE OF BOADICEA IN MODERN LONDON

"Regions Cæsar never knew, Thy posterity shall sway."

nizing lesson she taught was never forgotten. Rome, mistress of the world, was shown that wronged weakness may rise to maddened strength and become an instrument of terrible retribution.

The feats of Boadicea are commemorated in noble poetry and statuary. She looks from her lofty pedestal at the Houses of Parliament, in which are administered the affairs of an empire embracing realms that Cæsar never knew; a reminder that even the mightiest of human forces must observe justice to the lowliest of its citi-

Norsemen. When he died, in 901, there was not a Norseman in the land who was not a citizen or a prisoner in English hands.

The fifth and youngest son of Ethelwulf, Alfred was educated in Rome; but he had to distinguish himself as a soldier before he might give his attention to scholarship. Half his life was devoted to fighting. During his first thirty-five years London lay a waste, despoiled by the foe, and nearly all England was prostrate before those fierce and terrible hordes.

The valiant king put heart into a few troops and gained small victories; then, with larger forces he gained greater battles. But all seemed to have been lost in a defeat which drove Alfred to hide and entrench in the marshes. He came forth again undaunted, resumed his campaigns, fought from sea to sea right across England, and was never again defeated.

The Vikings came with horses; Alfred raised his own cavalry. They had much-dreaded war-galleys. He built bigger and better galleys, and laid foundations for a great English navy; he swept the Vikings from our seas, and sending his ships out, met and defeated the foe on their own coasts, so that they could not attempt invasion. He compelled the Danes who remained in England to swear fealty to him. He settled them on the land, gave peace within its borders, rebuilt and fortified London and the coast, and then, after being the greatest warrior of his age, became the greatest friend of peace.

HOW ALFRED'S WORK BEARS FRUIT AFTER A THOUSAND YEARS

To help rescue the land from ignorance, that dangerous enemy, he, with his own hands, translated history, religious and philosophical works from Latin into English, and sent copies through the land. He had the best of the old laws put into written form and established new ones, but always with the approval of his Parliament.

Much of his writing still exists, and it warms the heart and imagination after a thousand years. Alfred, one of the purest and sweetest spirits that England ever cradled, was greater and nobler than all the mythical heroes of legend and poetry. Alexander the Great as conqueror and educator of peoples, Cæsar as conqueror and just lawgiver, moved in greater spheres; but Alfred outshone both for the sublimest human qualities. He was savior of his land; teacher of his people; father of English prose; a hero and saint, who thought himself neither, but tried to make all his countrymen both.

Time passed, and the ideals of kingship changed. Although England had to defend herself against lawless encroachment, at times she was guilty of trespasses of the same sort. No Scotsman forgets that this was the case when Edward I sought to bring all Scotland under his sway.

WILLIAM WALLACE GATHERS HIS MEN TOGETHER IN THE HILLS

When the young Queen of Scots, who was called the Maid of Norway, died in the year 1290, the Scots were divided as to who should be king; and they asked Edward to judge between the men who claimed the throne. One of these men, John Baliol, said that he would recognize Edward as his overlord; therefore, the king gave judgment in favor of Baliol. But afterward he said that John Baliol, having sworn to be loyal to him, had broken his promise; so he drove Baliol from the throne, and sought to rule Scotland with English officers.

About this time there appeared a young man named William Wallace, who was strong and skillful with all manner of weapons. Once, when some English soldiers tried to rob him, he turned on them and slew them with his staff, though they were armed. The English set a price upon his head, and he fled to the hills. There gathered round him men determined to rid their native land of foreign masters. In 1297 the English governor moved northward with an army, and Wallace awaited him by the bridge near Stirling. The English began to march across the bridge; but, while a part of the army was on one side of the river and a part on the other, Wallace set upon them suddenly and put them utterly to rout. The fame of this exploit stirred up many more of the Scots to join Wallace, and the English were driven out.

After this Edward, who had been abroad, came back to England, and marched into Scotland with a strong army, having many mail-clad horsemen and archers. The Scots lords would not follow Wallace, for they were unwilling to be led by a captain who was not of noble birth. Nevertheless, Wallace, whose men were all on foot and armed with long spears, gave battle to King Edward at Falkirk. He and his men fought stoutly till Edward bade his archers send a storm of arrows among them. Then, when great gaps had been made in the ranks of the Scots, the English charged through and routed them.

ANDREAS HOFER, THE HEROIC INN- KEEPER OF THE TYROL

But, even after this, Wallace, having escaped, went on fighting against the English. At last a false knight betrayed him into the hands of English soldiers, and he

ALFRED BUILDS UP THE BRITISH FLEET



Since England was suffering from attacks of foes that came by sea, Alfred the Great, alert to see and meet the needs of his kingdom, gave careful attention to the plan of improving and increasing the fleet.

was taken a prisoner to England. King Edward, instead of treating Wallace as an honorable and valiant foe, declared that he was a base rebel and put him to a shameful death.

The freeing of France from the interference of English kings through the devoted leadership of the peasant maiden, Joan of Arc—one of the most wonderful stories in history—is described in the article beginning on page 5817.

In Austria is a land called Tyrol, and Napoleon caused the Austrian emperor to give the Tyrol to the king of Bavaria who was always ready to do his bidding. But when the Austrians went to war again with Napoleon, the Tyrolese rose up under Andreas Hofer, who was an innkeeper, and drove the French and the Bavarians out of the country, though they themselves were only peasants. For a short time Hofer was made their ruler, as a loyal subject of the Austrian emperor, though he would not obey the Bavarian king and the emperor of the French.

But the French armies defeated the Austrian armies, and the Tyrolese could not openly resist the power of Napoleon unaided. Then, though the brave Hofer hid among the mountains, a traitor was found who showed the French where he was. He was taken prisoner, and condemned and shot as a rebel. Yet the stand that Hofer made helped to give heart to the other nations of Europe to rise against the rule of Napoleon, and so in due time Napoleon was overthrown and the Tyrol was restored to its old freedom for which Hofer had fought and died.

THE FORLORN STATE OF ITALY UNDER HER FOREIGN RULERS

We turn next to Italy, land of the Cæsars, once mistress of the world; and we find her in the nineteenth century no longer proud and commanding, but broken and bowed under foreign rule. Coveted and snatched at by Spaniards, French and Austrians, this narrow Mediterranean peninsula had been split up into many small states and duchies, each with a tyrannous and hateful form of government. Austrian domination cast a heavy shadow across some of the fairest regions. The spirit of the foreign oppressors can be caught in the words of Austria's emperor, when he said to the people of the northern provinces, Lombardy and Venetia, "You belong to me by conquest, and you are to forget that you are Italian."

The feeling of nationality was not dead, but had been crushed down under a great weight. Who was to furnish the courageous thought, the burning spirit, that should breathe into the people an unconquerable faith in their own power and inflame them into boldness, until they would arise and shake off the hold of those who claimed to be their masters? In Genoa, in 1805, the great patriot and prophet was born. His name was Giuseppe (Joseph) Mazzini. And two years later, at Nice, was born Giuseppe Garibaldi, who was to become a dauntless heroic fighter for the cause which Mazzini planned and shaped.

HOW MAZZINI PLANNED AND PREACHED THE REDEMPTION OF ITALY

A sailor's son and himself at first a sailor, Garibaldi always made his way into the midst of stirring activities. Mazzini, son of a professor in the university, was always a thinker, a dreamer—but a dreamer who spent himself unsparingly to make his ideals come true. Even as a boy, this serious-minded Giuseppe, brooding upon the unhappy lot of Italy, felt that he ought always to dress in black, to wear mourning for his country. As a young man, having given up his great ambition, which was to devote his life to literature, he joined a revolutionary band and was arrested in consequence. After being released from prison, he had to go away from his own land and begin a life of exile which lasted the greater part of forty years. During that time, whether in France, Switzerland or England, he worked with one great aim—to plant within the people of Italy a belief that their country must be made a free, united nation, governed as a republic. He lost no time in organizing a society called "Young Italy," whose object was to educate and unite all who were opposed to the existing governments on Italian soil, and to work for liberty and humanity everywhere. For these ends the members must be willing to sacrifice selfish aims and to suffer any hardship. Mazzini set an example of simple living and true devotion. His great faith, becoming widely known through his flaming power of expression both in speech and in writing, influenced great hosts of young men. And "around them grew up a patriotism for a country that existed as yet only in the imagination."

Again and again Mazzini returned se-

THREE OF ITALY'S IMMORTALS



King Victor Emmanuel II upon his white horse is shown here greeting Garibaldi, the impetuous and untiring fighter for Italy's freedom. Garibaldi, who once asked "permission to disobey" his king's request not to invade Naples, a few months later accompanied the king when he drove in triumph through Naples.



Mazzini, in prison, had two great interests—the sight of sea and sky through his prison bars, and the taming of a little finch that flew into his cell.



If, when Andreas Hofer was governor of the Tyrolese, people addressed him as "Your Excellency," he would say, "I am Andreas Hofer, the peasant."

cretly to Italy, to counsel, encourage and direct. There was a price upon his head; it was death to give him shelter; but he came and went unbetrayed. Before his death, however, his long years of exile had ended; for his Italy had been redeemed and united—not, indeed, under republican rule, as he had hoped, but under a brave king, Victor Emmanuel II, whose sovereignty was proclaimed in 1861.

GARIBALDI, THE FISHERMAN'S SON WHO LED THE FIGHT FOR FREEDOM

The noble schemes of Mazzini could hardly have been carried to success without the aid of the lion-hearted Giuseppe Garibaldi. The same pure flame of patriotism which burned in the soul of Mazzini leaped clear and high in this born leader of men. Mazzini was the mind, Garibaldi was the sword, which won back Italy's unity and freedom.

Having early joined the society of "Young Italy," he was condemned to death, after taking part in an unsuccessful outbreak. From that time on, he spent his time either in exile or in leading revolutionary armies on Italian soil; for, whenever a revolt against oppression was started, Garibaldi rushed home to be in the thick of the fighting. At one time he fought gloriously in the cause of revolution in South America. At another time in Italy, after a campaign that failed, he was driven and hunted by French and Austrian armies down the eastern coast. His devoted wife, whom he had taken back with him from South America and who went everywhere with him, died during this flight. Whether wandering about the seas or living quietly as a candle-maker on Staten Island in the United States, Garibaldi was ever ready to respond to the faintest signal that showed he was needed in the land of his childhood.

At last, in 1860, his great moment arrived. By this time, his "very name was worth an army"; so, when he took into Sicily an astonishingly little force of "Red Shirts," his followers, the boldness and fearlessness for which he was known carried the expedition through great dangers to victory. In only a few months after this, the kingdom of Italy was proclaimed; but Garibaldi had already left the scene, refusing honors and rewards and sailing away to his island farm "with only a little money and a bag of seed beans for the spring planting."

LOUIS KOSSUTH, WHO FOUGHT WITH VOICE AND PEN FOR HUNGARY

Moved by the same spirit, Louis Kossuth set himself to win freedom for Hungary from the rule of Austria, at the very time when the Italians were seeking their liberty. He was not a soldier, but a writer and orator of great persuasive power. Those who listened to him were moved by his personal attractiveness and by his wonderful voice, as well as by his words. As an editor he wrote and distributed accounts of the government discussions, even after he had been warned and threatened, until finally he was put into prison. There he studied earnestly, learning the English language so well that he afterward was able to speak eloquently to audiences in England and the United States. After being released, he became a leader of thought among the people, and in a few years was elected a member of the Diet, the government council of the land.

Always making lively and passionate appeals for reforms, for democratic methods in government and society, Kossuth aroused strong feeling, not only in Hungary but throughout Austria. Changes came about; old political leaders lost their power; new laws were passed, throwing down old aristocratic customs and methods. Revolution seemed to be gaining all through Central Europe. But Austria began at once to send out armies to repress the movement toward liberty, and finally called upon Russia for help in subduing Hungary, where conflict between unfriendly races in the kingdom itself helped to hasten the failure of the revolt. Kossuth and other leaders had to fly from the country. After traveling in England and America, the brilliant but defeated patriot went to Italy, where he spent the rest of his life.

Kossuth did not live to see his dreams realized, as Mazzini and Garibaldi did; but we have witnessed changes such as he worked to bring about. The Austrian Empire has perished. Italy, which she once crushed down into depths of ignorance and misery, has now risen into power greater than even Mazzini dared to hope for; while Austria herself has dropped into a condition of wretchedness so forlorn that those who overthrew her can scarcely keep from weeping in pity. Those who think will find a lesson in this turn of events. Liberty is the most precious of the rights for which man longs.

To those who in its name meet difficulty and danger with courage and persistence it will come. But in its march it almost surely overwhelms those who have tried to hold it back from others. The tyrant may flourish in wrongdoing for a while, but the men who strive for liberty win in the end an enduring triumph.

SIMON BOLIVAR, WHO SPREAD THE GOSPEL OF LIBERTY IN SOUTH AMERICA

Two of the world's supreme defenders and creators of freedom—George Washington and Abraham Lincoln—come into the stories of the United States; here we may pause to think about the South American patriot and hero, Simon Bolivar.

Of noble birth, wealthy, son of a slave-owning family, he went to Madrid to study and saw the closing scenes of the French Revolution. Then he returned to Venezuela, his native place. After the death of his wife, which grieved him deeply, he made another trip to Europe, stopping in the United States on his way home. From this time on, he gave himself to spreading the gospel of liberty in South America. First, fighting under one of the revolutionary generals, he made a name for himself; and soon, at the head of a body of volunteers, he won several victories. He was called the Liberator of Venezuela. But the fortunes of war gave success now to one side, now to the other. When the Spanish general had defeated the revolutionary army in two engagements, Bolivar and his followers had to take refuge in the West Indies. There, on the island of Haiti, the scattered forces were gathered together and made ready to renew their efforts. Upon their return to their disputed home soil, they were able to drive back the Spaniards from point to point, and in 1819 to form a republic in which Venezuela and her sister state, New Granada, were united, with Bolivar for president. Called to be Dictator of Peru, he succeeded in ridding that region, too, of the Spanish masters; then, out of the southern part of Peru was formed the state of Bolivia, named in honor of the Liberator.

Unhappily, the story from this point on is one of growing dissatisfaction and disappointment. Bolivar, as ruler, was inclined to keep power in his own hands, and so was accused of having ambitions for himself. Venezuela broke away from the Republic of Colombia. Plots were formed against Bolivar personally, putting

his life in danger. Once he barely escaped. Finally the great leader who had spent most of his fortune in the cause of his country's liberty resigned his offices and retired, weary and heartbroken. Very soon afterward he died.

In the world-struggle for independence during the eighteenth and early nineteenth centuries the negroes of the island of Haiti had a share; and the man who became their foremost leader was himself a negro whose father and mother were slaves. His name at first was Toussaint Breda, but he is known to the world as Toussaint l'Ouverture. This change of name was made after someone who had been watching his vigorous fighting exclaimed, "Mais cet homme fait ouverture partout"—"Why, that man makes a gap wherever he goes." So, from that time, he became Toussaint the gap-maker, the opener of the way.

TOUSSAINT, THE BRAVE NEGRO CHIEF ON THE ISLAND OF HAITI

In Haiti the Spaniards held the eastern part, but there was a French colony on the western end of the island. A revolutionary decree in France had proclaimed citizenship for all free persons. This would include the free negroes of Haiti; the white planters there, however, tried to hold back the privilege as long as possible. In the rebellion of slaves which broke out in 1791 because of this, Toussaint had a part; and later, when the French decree of equality was withdrawn, he and his followers joined the Spaniards against the French.

Soon a proclamation from France granting freedom to all brought the negroes and their leader back into the French ranks, where Toussaint showed such ability that before long he was made commander-in-chief of the troops in Haiti. In 1801, when the fighting was over, the patriot leader held the position of dictator over the island. In spite of his humble beginnings he had had a good education and was prepared to rule with firmness and fairness. But the promising outlook for Haiti was promptly dimmed by Napoleon's act re-establishing slavery. Toussaint's answer was a declaration of independence. Then Napoleon sent an army to enforce his decree, and in a short time Toussaint, treacherously betrayed, was seized, carried captive to France and there allowed to die in prison.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 4707.

FRENCH—THE PARTY ON THE BOAT

First line, French; second line, English word; third line, as we say it in English.



Nous quittons l'Angleterre.
We leave the England.
We are leaving England.

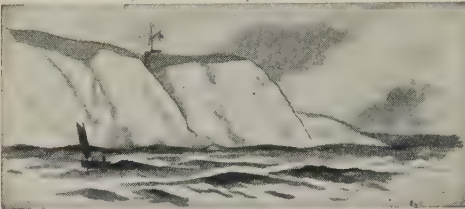
Maman n'aime pas la mer.
Mamma likes not the sea.
Mamma does not like the sea.

Elle descend dans la cabine.
She goes down into the cabin.
She goes down into the cabin.



Nous restons sur le pont avec papa.
We stay on the deck with Papa.
We stay on deck with Papa.

Nous aimons beaucoup la mer.
We like very much the sea.
We like the sea very much.



Il y a beaucoup de falaises.
There are many of cliffs.
There are many cliffs.

Jeannette voudrait voir des poissons.
Jenny would like to see some fishes.
Jenny wants to see some fishes.



Nous croisons un bateau à voiles.
We pass a boat with sails.
We pass a sailing boat.

Il y a un homme dans le bateau.
There is a man in the boat.
There is a man in the boat.



Le perroquet est tout seul.
The parrot is all alone.
The parrot is all alone.

Nous courons à la cage.
We run to the cage.
We run to the cage.

Quelqu'un dit: "La terre est en vue."
Somebody says: "The land is in sight."
Somebody says: "Land is in sight."



Maman se sent beaucoup mieux.
Mamma herself feels much better.
Mamma feels much better.

THE NEXT FRENCH STORY IS ON PAGE 4757.



WHY DOES A POPGUN GO POP?

THE pop of a popgun is, of course, a sound, and all sounds are waves of a particular kind produced in air. So the question really is, How does a popgun cause the kind of air-waves that we can hear? The answer is that air inside the gun is compressed and then suddenly released when the gun goes off. As it is released it naturally expands, or spreads itself out again, to fill the space it filled before it was compressed. This means, of course, that as it expands it gives a quick push to the air on all sides of it. So it starts the wave of air, which spreads out in all directions from the point where it started, and reaches our ears. The kind of wave is one which we hear as a very short sharp sound. It is short because the cause of it acts for only a very short time, and its sound is best represented by the word *pop*.

Pop is one of the many words which were invented in imitation of sounds. We use the word explosion to indicate the kind of sound that is made when a gas suddenly expands from a smaller to a larger space and so causes a wave in the air. Now, if we notice what we do when we make the letters *p* and *b*, we shall find the reason why students of letters call these the explosive consonants. They are both produced by explosions. If you say *both produced*,

CONTINUED FROM 4506



you will notice that the explosion is rather less for *b* and rather more for *p*; that is all the difference between them. But the present question is whether we are strictly right in calling *p* and *b* explosives, and the answer is

Yes. In making these consonants we actually do make little explosions; we do exactly the same as when we fire a popgun. We squeeze or compress the air in our mouths. When we have done that we allow it to force itself between our lips, which we began by closing. Try to say *p* or *b* with your mouth open!

Then the compressed air escapes explosively, as in the popgun when the cork flies out. It starts a wave in the air which we call *p* or *b*, according to the suddenness with which the air escaped. A *p* may be soft or a *b* loud, but that depends on what happens in the voice-box. The difference between the two, whether loud or soft, depends only on the suddenness of the explosion. So we learn that these consonants are called explosives not merely because they are like the sounds of little explosions, but because they are actually the sounds of little explosions caused by sudden expansion.

In a popgun, or in the case of the explosion that forms the letter *p*, the gas that is compressed and then al-

lowed to expand is air which already exists as air. But there is no air or any other gas in a cartridge, and the question may be asked, Where does the gas come from that makes the noise and fires the bullet when a gun is fired? What happens is that we burn a powder which, when burned, produces a large quantity of gas very suddenly. The gases produced are exceedingly hot. They are heated by the burning which makes them, and a hot gas occupies a great deal of space, far more than a cold gas. When we fire a gun, therefore, we suddenly produce a great quantity of hot gas in a tiny space which is not nearly sufficient to hold it. If this were done in a closed box it would burst the box, but in the case of the gun we have prepared a way out for it. We put a bullet in the way, and the gas, driving the bullet before it, starts the wave of sound which we call an explosion.

WHY DOES THE KETTLE NOT GET RED-HOT WHEN IT IS HEATED?

The reason is that water will hold more heat than any other thing we know. The water takes the heat from the kettle, and does not allow the bottom of the kettle ever to get hotter than the temperature of boiling water. That is hotter than our fingers can endure without being scalded, but it is much below the temperature at which iron becomes red-hot.

WHO IS PIERROT?

The popular French song which says

Au clair de la lune, mon ami Pierrot

has immortalized the name of Pierrot. Originally Pedrolino (a familiar diminutive for Pedro) was the name of a character on the Italian stage in the sixteenth century. Dressed all in white, and with his face chalked, he played the part of a buffoon-valet. In the seventeenth century the character passed into French comedy, and was generally represented as a young countryman with shrewd common sense. But the part of Pierrot is best known in pantomime. Here he wears an ample white frock with huge buttons and wide pantaloons; a black skull-cap fitting closely to his head throws into relief the dead whiteness of his face. Both cunning and simple, greedy and cowardly, Pierrot is also somewhat sentimental. He has a particular fondness for the moon, and is not entirely insensible to the beauties of poetry. The thick chalk on his

face, suppressing all the individual character of his features, helps him in all the plays of facial expression so important in these mute performances, so that Pierrot nearly always plays the chief part in pantomime.

WHAT WAS THE FIRST STRINGED INSTRUMENT?

Back through the ages we must go, centuries before the birth of Jesus, back to the very earliest records that exist of man's life on earth. There we find proof of the existence of instruments which must have taken more centuries still to reach that stage in development. In the wall-paintings of the Egyptians, belonging to a period of possibly 3000 B.C., we find pictures of harps shaped not unlike the instruments of to-day. They were handsome instruments, richly ornamented and standing more than six feet high, but differing from our modern harp in having no supporting pillar.

Nowadays by strings we mean the bowed instruments of the violin family. In the lyre, which the ancient Greeks borrowed from the Egyptians, we have a forerunner of our fiddle. From the lyre we get the common name applied to all the members of the violin family; we also get the idea of a number of strings. But the principal parts, the sound-box, finger-board, and movable bridge, come from the monochord. This consisted of a single stretched string. The Greeks in the time of Pythagoras could make the notes of the scale by cutting off portions of the string with a movable bridge.

From the lyre and the monochord it was a small step to the production of an instrument conforming in its essentials to the fiddle. We know that in the third century B.C. an instrument which was a combination of the lyre and monochord was in use among the Greeks.

The first bow that was used was probably the player's finger! The glass harmonica is a good example of what can be done with the aid of a little resin by using the finger as a bow.

IS THERE GOLD IN THE SEA?

Gold is one of the things we should not expect to find in sea-water, but we do find it in a quite recognizable quantity. If we consider the enormous bulk of the sea, the total quantity of gold in it must be considerable. Yet it is not enough to repay the cost of getting it out. So no

one does so, except chemists, who do it for love of nature and not for love of gold.

WHERE ARE THE CLOUDS WHEN THE SKY IS QUITE CLEAR?

Clouds, as we know, are made of water, and water can exist in the air in many different forms. When it forms a cloud, it is really in the form of liquid drops, like the collection of drops that forms a cloud from our breath on a frosty day. The water that formed the clouds is still in the sky when it is cloudless. What has happened is that, owing partly to the warmth of the sun, and partly, no doubt, to electrical conditions in the upper air, the air is capable of holding all the water in it in gaseous form. This water-vapor is as transparent as air itself. Indeed, it is much better for us to regard water-vapor as one of the things that make up the air, just as much as oxygen or nitrogen. It is difficult for us to realize when we look up at the sky on a cloudless day that we are looking through water. But we are certainly doing so just as if we had our eyes open under water and were looking up. If it were not for the water that forms part of the air, we should be utterly scorched by the heat of the sun. As it is, however, most of the sun's heat is caught by the water-vapor, which is very opaque to heat, though it is transparent to light.

WHEN WATER IS BOILING, WHY CAN IT NOT BE MADE HOTTER?

When water is boiling it can be made hotter, but not as liquid water. Water, like other things, has a certain temperature above which it cannot be a liquid, but must be a gas. Below this temperature it cannot be a gas, but must be a liquid or a solid. That point we call the boiling-point. We cannot make water hotter than boiling-point, because when we do, it ceases to be what we usually call water, and turns into gaseous water, or water-vapor. But it is quite possible to make water-vapor hotter than the temperature of boiling water.

If we go on boiling water we are certainly putting heat into it. We must not fancy that because the liquid water gets no hotter the heat is being lost, or wasted, or turned into nothing. Nothing is ever lost or turned into nothing. What the heat does is to put itself into the liquid water. The liquid water takes the form of a gas, and the heat still remains, though rather changed, in the energy of movement of the parts of the gas. We can

easily prove that the heat is doing something, though it is not making the water hotter. We find that if we go on boiling we boil all the water away; that is to say, we turn the whole of it into water-vapor.

But, on the other hand, it must be clearly understood that the boiling-point of water varies with atmospheric, or air, pressure. At ordinary atmospheric pressure it boils, as we know, at 212° Fahrenheit. On the top of a high mountain, where the atmospheric pressure is less, it will boil at a lower temperature. At the Dead Sea, which is more than two thousand feet below sea-level, and where the atmospheric pressure is therefore greater, its boiling-point will be over 212° Fahrenheit. In the early world where the atmosphere was very heavy, the boiling-point of water must have been very high.

WHAT HAPPENS WHEN A LEAF FALLS FROM A TREE?

We have seen the changes that take place in the leaf as the summer goes. When the leaf falls to the ground there are waiting for it many tiny living creatures called microbes which make it decay. But this really means that the stuff of the leaf is changed in such a way that it can be taken up by the plant from the soil and built up again into the plant when the spring comes. This is one of the most beautiful and wonderful things in nature. There is no greater lesson we can learn than that what looks like useless death and decay and waste is really nothing of the sort, but a living process that makes for more life. Some may say, Why should not the leaves and flowers live on all the year round, as they do in some plants for special reasons? But the leaf is made in order to use the sunlight. In the winter there is not enough sunlight, and so the leaf would be wasting its time. The plant therefore takes what it can use from the leaf. The rest of the leaf is changed, so that the plant can use that, too, when the summer is coming, and there is a use for new leaves.

WHAT DOES THE LAW MEAN BY "AN ACT OF GOD"?

The law describes this as an accident due to natural causes, directly and entirely without human assistance, which could not have been avoided by any kind of pains, foresight and care reasonably to be expected. It is an Act of God, for example, if a house is struck by lightning, and damaged.

WHY DO WE SEE LIGHTS WHEN WE GET A BLOW ON THE EYE?

This depends on a wonderful law about the nerves of the senses which was discovered by a German named Müller about the middle of last century. It is that special nerves which belong to the various senses are bound to give us a sensation if they give us anything. As a rule, the particular nerve is affected only by the special thing it is meant for—the eye-nerve by light or the ear-nerve by sound. But if something else has the power of affecting the nerve, then we shall seem to see or hear, whatever the thing that excites the nerves really is. Thus a blow on the eye may affect the eye-nerve. When the eye-nerve is affected we are bound to get a sensation of light.

The best proof of this great law is furnished by electricity. We have no special sense for electricity, as we have the ear for sound or the eye for light. But electricity is capable of stimulating any nerve in the body. With the electric current we may affect the nose, and the person smells; the eye, and he sees; the ear, and he hears; the tongue, and he tastes; the skin, and he has the sense of touch. We now know how to explain this law. It is not that the nerve of the eye is different from the nerve of the ear, but that it goes to a special part of the brain. Each part of the brain that is concerned in the sensation is *specialized*, that is, it can only do one thing. The different parts are like the notes of a piano, each of which gives out only the sound natural to it and no other.

CAN THE FOUNDATIONS OF A BUILDING BE RELAID?

Many old buildings have had their foundations rebuilt, but the most remarkable example of renewal was that of Winchester Cathedral in England. Early in the present century it was found that there had been a serious sinking-down of the cathedral. A pit was sunk, and it was found that beech trees had been used in the foundation, and while some of them remained sound after seven hundred years, many had decayed. But more serious than this knowledge was the fact that when the excavation was made to examine the foundations, water rushed in from the river Itchen, and in some parts was soon fourteen feet deep. This made the work of repair far more urgent. It was decided that an immense bed of

concrete must be laid right under the cathedral, thus providing a solid foundation capable of sustaining the weight of the old masonry. The water which had rushed in could not be pumped out, for fear of drawing gravel from other parts of the foundation. As all the work would have to be performed under water an experienced diver, W. R. Walker, was engaged. To him, working with the architect and the contractors, the ultimate success of this great feat was due. Owing to the peat in the soil the water became black, and everything had to be done in pitch darkness. As the diver removed the peat and old timber from under the cathedral he placed bags of concrete in position, and on top of these, great blocks of masonry. In this way the foundations were renewed, piece by piece, and after six years Winchester Cathedral was safe.

CANNOT WE BLEED UNLESS A HOLE IS MADE IN OUR VEINS?

It is true that our blood is shut in a set of closed tubes called arteries, veins and capillaries, and we never can bleed unless a hole has been made in the wall of one of these tubes. A little scratch anywhere in the skin is certainly not likely to strike an artery, for these usually lie deep. Nor yet will it open a vein, for, though many veins lie just under the skin, and their walls are much thinner than those of an artery, they are too thick for a slight scratch to pierce.

Between the arteries carrying the blood from the heart and the veins which return it to the heart, the blood runs in tubes as slight as hairs. These are called capillaries, which comes from the Latin word for "hair." Any slight scratch on the skin is likely to tear or cut a few capillaries, and then, of course, we bleed. As there is no pulse in the capillaries, the blood simply oozes out; but if an artery is cut, the blood spurts.

The blood would be useless if it merely circulated in closed tubes. All sorts of things pass through the walls of the capillaries, and that is why we have blood.

WHAT DO WE MEAN WHEN WE SAY "FRENCH LEAVE"?

To take French leave means to do a thing without asking permission. It arose from the fact that the French soldiers used to take what they liked from a conquered city without asking leave or without paying.

THE NEXT WONDER QUESTIONS ARE ON PAGE 4825.

The Book of POETRY

A GREAT POEM BY ROBERT BURNS

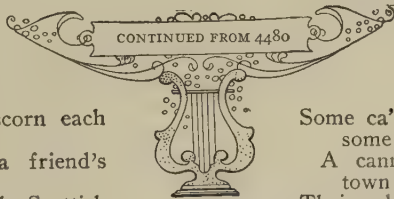
ROBERT BURNS, the greatest of Scottish poets, did not write many long poems. Most of his compositions are in the short form of songs, in which no one has excelled him. Perhaps the most beautiful of his few longer pieces is *The Cotter's Saturday Night*, which describes, with the purest admiration, a domestic picture of Scottish humble life which is probably as true to-day as it was in the time of Burns. In nothing that Burns wrote can we better observe the warm-hearted nature of the poet than in this poem in praise of these qualities, which not only make for the happiness of individuals, but for the power and patriotism of nations. The first stanza of the poem is really an inscription to Robert Aiken, one of Burns's earnest friends, whose memory is thus enshrined forever.

THE COTTER'S SATURDAY NIGHT

MY lov'd, my
honour'd, much
respected friend!
No mercenary bard
his homage pays;
With honest pride I scorn each
selfish end,
My dearest meed, a friend's
esteem and praise.
To you I sing, in simple Scottish
lays,
The lowly train in life's sequester'd scene;
The native feelings strong, the guileless
ways;
What Aiken in a cottage would have
been;
Ah! tho' his worth unknown, far happier
there, I ween.

November chill blows loud wi' angry
sough;
The short'ning winter day is near a
close;
The miry beasts retreating frae the
pleugh;
The black'ning trains o' craws to their
repose.
The toil-worn cotter frae his labour goes—
This night his weekly toil is at an end—
Collects his spades, his mattocks, and his
hoes,
Hoping the morn in ease and rest to
spend,
And weary, o'er the moor, his course does
hameward bend.

At length his lonely cot appears in view
Beneath the shelter of an aged tree;
Th' expectant wee things, toddlin' stacher
thro'
To meet their dad, wi' flichterin' noise
an' glee.
His wee bit ingle, blinkin' bonnily,
His clean hearth-stane, his thriftie
wife's smile,
The lisping infant prattling on his knee,
Does a' his weary carking cares beguile,
An' makes him quite forget his labour an'
his toil.



Belyve the elder bairns
come drapping in,
At service out
among the farm-
ers roun';
Some ca' the pleugh, some herd,
some tentie rin
A cannie errand to a neebor
town:
Their eldest hope, their Jenny,
woman grown,
In youthfu' bloom, love sparklin' in her
e'e,
Comes hame, perhaps to show a bra' new
gown,
Or deposit her sair-won penny fee,
To help her parents dear, if they in hard-
ship be.
Wi' joy unfeign'd brothers and sisters
meet,
An' each for other's welfare kindly spiers:
The social hours, swift-wing'd, unnotic'd
fleet;
Each tells the uncos that he sees or hears.
The parents, partial, e'e their hopefu'
years,
(Anticipation forward points the view):
The mother, wi' her needle an' her shears,
Gars auld claes look amais't as weel's the
new;
The father mixes a wi' admonition due.
Their master's an' their mistress's com-
mand
The youngers a' are warned to obey,
An' mind their labours wi' an eydent hand,
And ne'er, tho' out o' sight, do jauk or
play:
"An' oh, be sure to fear the Lord alway,
And mind your duty, duly, morn an'
night!
Lest in temptation's path ye gang astray,
Implore His counsel and assisting
might!
They never sought in vain that sought the
Lord aright!"
But, hark! a rap comes gently to the door.
Jenny, wha kens the meaning o' the
same,

Tells how a neebor lad cam o'er the moor,
To do some errands, and convoy her hame.
The wily mother sees the conscious flame
Sparkle in Jenny's e'e, and flush her cheek;
Wi' heart-struck anxious care inquires his
name,

While Jenny hafflins is afraid to speak:
Weel pleas'd the mother hears it's nae wild
worthless rake.

Wi' kindly welcome Jenny brings him ben,
A strappan youth; he tak's the mother's
eye:

Blithe Jenny sees the visit's no ill-ta'en;
The father chacks o' horses, pleughs, and
kye.

The youngster's artless heart o'erflows wi'
joy,
But, blate and laithfu', scarce can weel be-
have;

The mother, wi' a woman's wiles, can spy
What makes the youth sae bashfu' an' sae
grave,
Weel pleas'd to think her bairn's respected
like the lave.

O happy love! where love like this is found!
O heart-felt raptures! bliss beyond com-
pare!

I've paced much this weary mortal round,
And sage experience bids me this declare:
"If Heav'n a draught of heavenly pleasure
spare,

One cordial in this melancholy vale,
'Tis when a youthful, loving, modest pair,
In other's arms breathe out the tender tale
Beneath the milk-white thorn that scents the
ev'ning gale."

Is there, in human form that bears a heart,
A wretch, a villain, lost to love and truth,
That can, with studied, sly, ensnaring art,
Betray sweet Jenny's unsuspecting youth?
Curse on his perjur'd arts! dissembling
smooth!

Are honour, virtue, conscience, all exil'd?
Is there no pity, no relenting ruth,
Points to the parents fondling o'er their
child;

Then paints the ruin'd maid, and their dis-
traction wild?

But now the supper crowns their simple
board:

The halesome parritch, chief o' Scotia's
food;

The soupe their only hawkie does afford,
That 'yont the hallan snugly chows her
cood;

The dame brings forth in complimental
mood,

To grace the lad, her weel-hain'd kebbuck
fell;

An' aft he's prest, an' aft he ca's it guid,
The frugal wife, garrulous, will tell,
How 'twas a towmond auld, sin' 'lint was i'
the bell.

The cheerfu' supper done, wi' serious face
They round the ingle form a circle wide:
The sire turns o'er, wi' patriarchal grace,
The big ha' Bible, ance his father's pride:
His bonnet rev'rently is laid aside,
His lyart haffets wearing thin an' bare:

Those strains that once did sweet in Zion
glide,
He wales a portion with judicious care;
And "Let us worship God!" he says, with
solemn air.

They chant their artless notes in simple
guise;
They tune their hearts—by far the noblest
aim!

Perhaps Dundee's wild warbling measures
rise,

Or plaintive Martyrs, worthy of the name;
Or noble Elgin beats the heav'nward flame,
The sweetest air of Scotia's holy lays:
Compar'd wi' these, Italian trills are tame;
The tickled ears no heart-felt raptures
raise;

Nae unison hae they wi' our Creator's praise.

The priest-like father reads the sacred page,
How Abram was the friend of God on
high;

Or Moses bade eternal warfare wage
With Amalek's ungracious progeny;
Or how the royal bard did groaning lie
Beneath the stroke of Heaven's avenging
ire;

Or Job's pathetic plaint, and wailing cry;
Or rapt Isaiah's wild, seraphic fire;
Or other holy seers that tune the sacred lyre.

Perhaps the Christian volume is the theme:
How guiltless blood for guilty man was
shed;

How He, who bore in Heaven the second
name,

Had not on earth whereon to lay His head:
How His first followers and servants sped;
The precepts sage they wrote to many a
land:

How he, who lone in Patmos banished,
Saw in the sun a mighty angel stand,
And heard great Bab'lon's doom pronounc'd
by Heaven's command.

Then kneeling down to Heaven's Eternal
King,

The saint, the father, and the husband
prays:

Hope "springs exulting on triumphant wing,"
That thus they all shall meet in future
days:

There ever bask in uncreated rays,
No more to sigh, or shed the bitter tear,
Together hymning their Creator's praise,
In such society yet still more dear;
While circling time moves round in an eternal
sphere.

Compar'd with this, how poor Religion's
pride,

In all the pomp of method, and of art,
When men display to congregations wide
Devotion's ev'ry grace, except the heart!

The Power, incens'd, the pageant will desert,
The pompous strain, the sacerdotal stole;

But haply, in some cottage far apart,
May hear, weel pleas'd, the language of the
soul,

And in His Book of Life the inmates poor
enrol.

Then homeward all take off their sev'ral way;
 The youngling cottagers retire to rest;
 The parent pair their secret homage pay,
 And proffer up to Heav'n the warm request,
 That He who stills the raven's clam'rous nest,
 And decks the lily fair in flow'ry pride,
 Would, in the way His wisdom sees the best,
 For them and for their little ones provide;
 But, chiefly, in their hearts with grace divine
 preside.

From scenes like these old Scotia's grandeur
 springs,
 That makes her lov'd at home, rever'd
 abroad:
 Princes and lords are but the breath of kings;
 "An honest man's the noblest work of
 God!"
 And, certes, in fair Virtue's heav'nly road,
 The cottage leaves the palace far behind.
 What is a lordling's pomp?—a cumbrous
 load,
 Disguising oft the wretch of human kind,
 Studied in arts of hell, in wickedness refined!

O Scotia! my dear, my native soil!
 For whom my warmest wish to Heaven is
 sent,
 Long may thy hardy sons of rustic toil
 Be blest with health, and peace, and sweet
 content!
 And, oh, may Heav'n their simple lives
 prevent
 From luxury's contagion, weak and vile!
 Then, how'er crowns and coronets be rent,
 A virtuous populace may rise the while,
 And stand, a wall of fire, around their much-
 lov'd Isle.

O Thou! who pour'd the patriotic tide
 That stream'd thro' Wallace's undaunted
 heart;
 Who dar'd to nobly stem tyrannic pride,
 Or nobly die, the second glorious part
 (The patriot's God, peculiarly Thou art,
 His friend, inspirer, guardian, and reward),
 Oh never, never, Scotia's realm desert,
 But still the patriot, and the patriot bard,
 In bright succession raise, her ornament and
 guard!

EPITAPH ON THE COUNTESS DOWAGER OF PEMBROKE

UNDERNEATH this sable hearse
 Lies the subject of all verse:
 Sidney's sister, Pembroke's mother:
 Death, ere thou hast slain another,
 Fair, and learned, and good as she,
 Time shall throw a dart at thee.

Marble piles let no man raise
 To her name: in after days,
 Some kind woman born as she,
 Reading this, like Niobe
 Shall turn marble, and become
 Both her mourner and her tomb.

—WILLIAM BROWNE.

THY WAY, NOT MINE, O LORD

Dr. Horatius Bonar, who was born in Edinburgh, December 19, 1808, and died July 31, 1889, was a celebrated writer of hymns which breathe the purest faith and hope. The following example of his writings is unrivaled for the expression of the Christian's faith, and ranks with Newman's beautiful hymn *Lead Kindly Light*, which is given on page 4435.

THY way, not mine, O Lord,
 However dark it be;
 Lead me by Thine own hand,
 Choose out the path for me.

Smooth let it be or rough,
 It will be still the best;
 Winding or straight, it leads
 Right onward to Thy rest.

I dare not choose my lot;
 I would not if I might:
 Choose Thou for me, my God,
 So shall I walk aright.

The kingdom that I seek
 Is Thine: so let the way
 That leads to it be Thine,
 Else I must surely stray.

Take Thou my cup, and it
 With joy or sorrow fill,
 As best to Thee may seem;
 Choose Thou my good and ill.

Choose Thou for me my friends,
 My sickness or my health;
 Choose Thou my cares for me,
 My poverty or wealth.

THE CHARACTER OF A HAPPY LIFE

Sir Henry Wotton was a famous Englishman who lived from 1568 to 1639, and was eminent in the service of his country, being for many years its ambassador at Venice. In the later years of his life he became a clergyman, and wrote a number of essays, chiefly of a religious character. Like most of the scholars of his age, he also wrote poetry. He was a great friend of Izaak Walton, and often went fishing on the river Thames with him. The following poem is the most familiar of the few that are well known.

HOW happy is he born or taught,
 That serveth not another's will;
 Whose armour is his honest thought,
 And simple truth his utmost skill!

Whose passions not his masters are;
 Whose soul is still prepared for death;
 Untied unto the world by care
 Of public fame, or private breath!

Who envies none that chance doth raise,
 Or vice; who never understood
 How deepest wounds are given by praise,
 Nor rules of state, but rules of good!

Who hath his life from rumours freed;
 Whose conscience is his strong retreat;
 Whose state can neither flatterers feed,
 Nor ruin make oppressors great!

Who God doth late and early pray
 More of His grace than gifts to lend,
 And entertains the harmless day
 With a well-chosen book or friend.

This man is freed from servile bands
 Of hope to rise or fear to fall:
 Lord of himself, though not of lands,
 And having nothing, yet hath all.

THE SPACIOUS FIRMAMENT ON HIGH

On page 486 is Joseph Addison's paraphrase of the Twenty-third Psalm, and here is the same author's paraphrase of the Nineteenth Psalm. In its Bible version this psalm was a great favorite of St. Augustine, and Addison has skillfully retained all the teaching of the original, while expressing it in the modern poetic form.

THE spacious firmament on high;
With all the blue ethereal sky,
And spangled heavens—a shining frame—
Their great Original proclaim.
The unwearied sun, from day to day,
Doth his Creator's power display,
And publishes to every land
The work of an Almighty hand.

Soon as the evening shades prevail,
The moon takes up the wondrous tale,
And, nightly, to the listening earth,
Repeats the story of her birth:
Whilst all the stars that round her burn,
And all the planets in their turn
Confirm the tidings as they roll,
And spread the truth from Pole to Pole.

What though in solemn silence all
Move round this dark terrestrial ball;
What though no real voice nor sound
Amidst their radiant orbs be found.
In reason's ear they all rejoice,
And utter forth a glorious voice,
For ever singing as they shine:
The hand that made us is divine.

LULLABY! O LULLABY!

The writer of the following very popular baby song was William Cox Bennett, originally a watchmaker at Greenwich, England, where he was born in 1820. He wrote many songs and sketches, and died in 1895.

LULLABY! O lullaby!
Baby hush that little cry!
Light is dying,
Bats are flying,
Bees to-day with work have done;
So, till comes the morrow's sun,
Let sleep kiss those bright eyes dry!
Lullaby! O lullaby!

Lullaby! O lullaby!
Hushed are all things far and nigh;
Flowers are closing,
Birds reposing,
All sweet things with life are done.
Sweet, till dawns the morning sun,
Sleep then kiss those blue eyes dry!
Lullaby! O lullaby!

FLEET STREET

In these lines the young English poet Shane Leslie expresses the thought that came to him in Fleet Street.

I NEVER see the newsboys run
Amid the whirling street,
With swift untiring feet,
To cry the latest venture done,
But I expect one day to hear
Them cry the crack of doom
And risings from the tomb,
With great Archangel Michael near,
And see them running from the Fleet
As messengers of God,
With Heaven's tidings shod
About their brave, unwearied feet.

THE BABY AND THE BROOK

In this very beautiful song, sweet with the fresh charm of nature, Longfellow, the American poet, has given an English setting to a short poem by the famous Armenian writer named Leon Alishan, which has been popular among the countrymen of that poet for many years.

DOWN from yon distant mountain height
The brooklet flows through the village
street;

A boy comes forth to wash his hands,
Washing, yes, washing; there he stands,
In the water cool and sweet.

Brook, from what mountain dost thou come?
O my brooklet cool and sweet!
I come from yon mountain high and cold,
Where lieth the new snow on the old,
And melts in the summer heat.

Brook, to what river dost thou go?
O my brooklet, cool and sweet!
I go to the river there below
Where in bunches the violets grow,
And sun and shadow meet.

Brook, to what garden dost thou go?
O my brooklet, cool and sweet!
I go to the garden in the vale
Where all night long the nightingale
Her love-song doth repeat.

Brook, to what fountain dost thou go?
O my brooklet, cool and sweet!
I go to the fountain at whose brink
The maid that loves thee comes to drink,
And whenever she looks therein,
I rise to meet her, and kiss her chin,
And my joy is then complete.

MISERERE DOMINE*

Miserere Domine means "Pity us, Lord." The writer, John Godfrey Saxe (1816-87), was an American poet whose poems were usually bright and humorous, but here he shows how grave and tender and humble he was at heart.

HAVE pity, Lord! we humbly cry,
With trembling voice and tearful eye;
Thou knowest our ignorance and sin,
And what by grace we might have been,
All—all is known, O Lord, to thee;
Miserere Domine!

Our public walks and private ways;
The follies of our youthful days;
Our manhood's errors—every stain
Of lust and pride to thee are plain;
For who, O Lord, can hide from thee?
Miserere Domine!

Too late we mourn our wasted hours,
Neglected gifts, perverted powers;
Affections warm, of heavenly birth,
Lavished, alas! on toys of earth:
How far estranged, O Lord, from thee!
Miserere Domine!

Our Father! ever-blessed name!
To thee we bring our sin and shame;
Weak though we be, perverse of will,
Thou art our gracious Father still,
Who knowest well how frail we be.
Miserere Domine!

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LITTLE VERSES FOR VERY LITTLE PEOPLE

BOW, wow, wow, whose dog art thou?
Little Tom Tinker's dog.
Bow, wow, wow.



DICKERY, dickery,
dare, [air;
The pig flew up in the
The man in brown soon
brought him down,
Dickery, dickery, dare.

"CROAK," said the toad, "I'm hungry,
I think,
To-day I've had nothing to eat or to
drink;
I'll crawl to a garden and jump through
the pales,
And there I'll dine nicely on slugs and on
snails."



"Ho, ho!" quoth the frog, "is that what
you mean?
Then I'll hop away to the next meadow
stream,
There I will drink, and eat worms and
slugs, too,
And then I shall have a good dinner,
like you."

PETER, Peter, pumpkin eater,
Had a wife and couldn't keep her;
He put her in a pumpkin shell,
And there he kept her very well.

MOLLY, my sister, and I fell out,
And what do you think it was
about?

She loved coffee, and I loved tea,
And that was the reason we couldn't
agree.

PUNCH and Judy
Fought for a pie,
Punch gave Judy
A knock in the eye.
Says Punch to Judy:
"Will you have
any more?"



Says Judy to Punch:
"My eye is too sore."

HUSH-A-BYE, baby,
Daddy is near;
Mamma is a lady,
And that's very clear.

THERE were three sisters in a
hall;
There came a knight amongst them all.
Good-morrow, aunt, to the one;
Good-morrow, aunt, to the other;
Good-morrow, gentlewoman, to the third.
If you were my aunt,
As the other two be,
I would say good-morrow,
Then, aunts, all three.

CHARLEY, Charley, stole the barley
Out of the baker's shop,



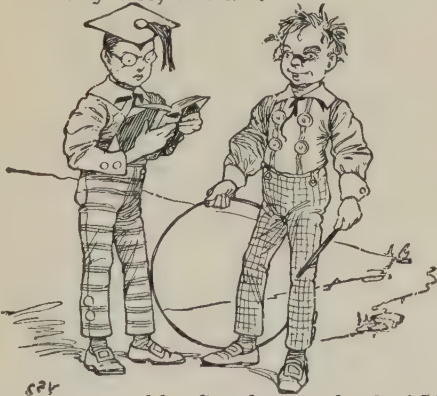
The baker came out and gave him a clout,
Which made poor Charley hop.

THERE were once two cats of Kilkenny,
Each thought there was one cat too many;



So they fought and they fit,
And they scratched and they bit,
Till, excepting their nails
And the tips of their tails,
Instead of two cats, there weren't any.

CLAP, clap handies,
Mammie's wee, wee ain;
Clap, clap handies,
Daddie's comin' hame;
Hame till his bonny wee bit laddie;
Clap, clap handies,
My wee, wee ain.



LITTLE Bobby Snooks was fond of his books,
And loved by his usher and master;
But naughty Jack Spry, he got a black eye,
And carries his nose in a plaster.

PUSSY-CAT Mew jumped over a coal,
And in her best petticoat burnt a great hole.
Poor Pussy's weeping, she'll have no more milk,
Until her best petticoat's mended with silk!

LAVENDER blue and rosemary green,
When I am king you shall be queen;
Call up my maids at four o'clock,
Some to the wheel and some to the rock,
Some to make hay and some to shear corn,
And you and I will keep ourselves warm.

A NICK and a nock,
A hen and a cock,
And a penny for my master.



AS I was going to sell my eggs,
I met a man with crooked legs;
Crooked legs and turned-up toes,
I tripped up his heels, and he fell on his nose.

ROBIN-A-ROBIN
Bent his bow,
Shot at a pigeon,
And killed a crow.

JACK SPRAT had a pig, who was not very little, nor yet very big;
He was not very lean, he was not very fat;
He'll do well for a grunt, says little Jack Sprat.





Figures from a panel on the famous Baptistery gates of Florence.

ITALY'S IMMORTALS

THERE are many people who think that since the art of Greece there has been nothing worthy. On the other hand, most of the very modern artists rule Greek sculpture out altogether as being too smooth and soft, too prettily musical.

Between these two extremes of thought lies the accepted faith of the mass of art-lovers. They believe that so far there have been two great movements in the story of the world's sculpture—the Greek and the Italian. After Athens, Florence: the two queen-towns in art's dominion.

Most of the Italian sculptors were Florentine by birth, and the greater part of their work remains in Italy. This is one of the reasons why people come from all parts of the world to visit Florence and Rome. A large number of famous Italian paintings have been carried away into other countries; the sculpture, mercifully, stays at home, and looks much more beautiful there than it would in a museum.

Italian sculpture really began in the middle of the thirteenth century. The first great master was a man called Niccola, who first worked in Apulia, where one of the emperors had encouraged a body of artists to develop

CONTINUED FROM 4470



a school; and then, among other places, at Pisa. From this town he got the surname by which he is now known, Niccola Pisano.

We must not allow ourselves to think that Niccola was the first of an unbroken procession of Italian sculptors. He is an isolated and unique presence—in a way, a procession in himself. His art was a little Gothic and the rest Roman—what we call now, antique. More than a hundred years had to pass before another great sculptor appeared in Italy, and by that time Roman art seemed to be forgotten.

Niccola was born about the year 1206. His best-known works are two marble pulpits, one in Siena and the other in the Baptistery at Pisa—generally called Niccola's finest production. It is a remarkable piece of sculpture, hexagonal in shape, supported by nine columns. The most striking feature is the relief work, which is carved very deeply, so that the figures are almost separate from the background.

If we saw nothing but these reliefs, we should say the sculpture was the work of a Roman artist, as their whole feeling and treatment is antique. In form alone is the pulpit Gothic. The Virgin Mary seems like a Roman ma-

tron, the figure of Christ like an adapted athlete, and the rest of the forms in the relief bear a likeness to Rome. It is easily explained by the fact that Niccola spent his youth in Apulia studying Roman sculpture and coins.

FROM NICCOLA PISANO TO THE BRONZE DOORS OF Ghiberti

The pulpit in the ancient Baptistery at Siena is larger and more profusely adorned. Niccola had a very serious fault—he crowded his compositions. For that matter, Niccola did many things wrongly according to the canons of art. His heads are too big, his figures are too uneasy. They all crowd to the front: there is no perspective. But the interest of Niccola lies for us in his art seen from the point of view of his period. Italy had been dead, artistically, so long. He was the first man to do something vital in art.

Niccola's son was a sculptor whose work was naturalistic, under the influence of the art that was being produced in France and Flanders. But Andrea Pisano, who worked under the same influence, had bigger feeling and greater mastery than Giovanni. His finest work is on the bronze door he made for the Baptistery at Florence, which became a model for Ghiberti nearly a century later.

This Andrea, in his turn, was succeeded by Andrea Orcagna, a gifted genius who was painter and architect as well as sculptor.

One of the most famous pieces of bronze relief work in the world is that of the Baptistery doors at Florence. These gates are well known now because of the quality of their decoration; they were for a generation or two a household word in all art communities in the neighborhood of Florence, because the "governors of the Baptistery" arranged a competition among sculptors to find the most worthy. Each competitor was given a quantity of brass, and he was required to make a relief-panel of a certain size, showing the story of Abraham about to sacrifice Isaac.

THE SPLENDID BRONZE PANELS THAT SHOW PERSPECTIVE

Ghiberti's panel was much the best of the various competitors; the next best was Brunelleschi's. For some time, in the history of Italian sculptors, we come across the phrase, "he also competed for the Baptistery doors."

Between the making of Niccola's reliefs at Pisa and the making of Ghiberti's

doors Italian art had developed astonishingly. Ghiberti's bronze reliefs are, as reliefs, wonderful, for within the limits of this style of work the sculptor has been able to show perspective. He makes his more distant figures in fainter relief than the rest. And the composition is very fine, with plenty of space and no bulging-out figures crowding to the front. There is a picture of the second of the doors, the most famous, on page 1741; and you can get a better idea of one of the ten panels from the headpiece on page 4603.

Ghiberti lived from 1378 to 1455, and he did an extraordinary amount of work, mostly in bronze. He spent almost thirty years on the Baptistery doors.

A SIMPLE LIFE THAT WAS CROWDED WITH GLORIOUS WORK

This achievement overshadows his other labors, such as the statues of St. John Baptist and St. Matthew in the Church of San Michele; the font of the Baptistery at Siena, where he worked with Donatello and Jacopo della Quercia; and the labor on the Duomo, during which he quarreled with his rival architect-sculptor Brunelleschi. This was a fine, stirring quarrel that roused all Florence. Several of Ghiberti's minor bronzes can be seen in the Bargello, the national museum in the old town.

When we look at the great bronze doors we know without being told that Ghiberti lived in an age of painters. The whole feeling of the panels is pictorial. Perhaps this is why he had such an effect on the later painters of Florence; his work seemed to be an undying inspiration.

Another sculptor, a contemporary of the master of the bronze doors, a man who also influenced painting very much, was Donatello. He lived from 1386 to 1466, and his life was like Ghiberti's in this, that it was crowded with glorious work. Donatello had a very lovable nature, with a genius for friendship, the gift of being easily pleased, and a love of simplicity in his daily life.

There is a pretty story of Donatello and the great man Cosimo Medici. The sculptor had a trick of wearing comfortable, shabby clothes; and Cosimo, seeing him one day more shabby than usual, sent him an outfit—a rich scarlet cloak, a cap and a doublet. Donatello obligingly wore them for one day, and then sent them back and begged to be excused. Cosimo's son gave Donatello a fine country

house; but the servants and all the grandeur troubled his simple soul, and again he begged to be excused and returned to his own dingy abode.

THE LASTING INFLUENCE OF DONATELLO ON THE SCULPTURE OF EUROPE

This man of many faithful friends, this warm, loving-hearted Florentine, was of the texture of granite where his work was concerned. He is the greatest figure we have met so far in the Italian company. The chief note of his work was a strong and healthy realism. His sculpture was like a tonic to the painters of his day; he cured them of the sentimentalism encouraged by the Fra Angelican school. Donatello's influence lasted in Europe for centuries, and the spirit of his work is still alive. His power over succeeding generations was greater than Michelangelo's because his work was more normal, more easily grasped by lesser minds.

Donatello's genius found expression in several kinds of sculpture, from the delicate low reliefs like the St. Cecilia and the little St. John, to the magnificent equestrian monument to the *condottiere* Gattamelata. Compare that statue with the exquisite child's head shown above it on page 4615.

In between these two extremes of style come a great number of statues, monuments and carvings of all sorts. When Donatello was only nineteen he began his public work. To his early years belong the Four Evangelists, Abraham and Isaac, and the famous St. George, which is in the Bargello. This is supposed to be Donatello's finest statue. A little later he carved the marble David, now in the National Museum, where the little bronze David is also treasured.

THE BEAUTIFUL GALLERY OF CHILDREN AGAINST A BACKGROUND OF GOLD

Donatello made a number of wonderful tombs. Among the most famous are the pope's tomb in the Baptistery at Florence; the cardinal's tomb at Naples; and a huge monument for the Medicis in the San Lorenzo chapel. In this work he was helped by Michelozzi, one of his pupils. He seems to have spent years doing nothing but carving magnificent tombs. A little later he made a lovely marble relief on the front of the singing gallery in the cathedral. Here he carved a band of children against a gold background—one of the most charming pieces of fifteenth-century sculpture.

The most famous of Donatello's bronzes, the Judith and Holofernes group, was not his best. The work owed its renown, not to artistic merit, but to the bearing that the subject had on the troubled history of the day.

The unwearying artist went from one kind of sculpture to another, and from one place to another. He found time to do small pieces of work, like mirror-cases and terra-cotta busts, and small decorative panels for the homes of his friends and patrons. He carved some fine statues in wood, like the Magdalen in the Baptistery at Florence and the St. John in a monk's church in Venice. Some of his finest work was done in Padua, including a fine crucifix and several reliefs, most of the subjects being taken from the Gospels.

PUPILS OF DONATELLO WHO HAVE NAMES FAMOUS IN SCULPTURE

The great effect which Donatello's work had on his own and succeeding generations was to make sculptors and painters ashamed of any affectation. He tried to make his work as lifelike and natural as possible, and was the first sculptor of Italy to have such an ideal.

He had a number of pupils always at work in his studio. Those whose names are best known are Nanni di Banco, Desiderio da Settignano, Michelozzo and Verrocchio. The last three are the most important. Verrocchio (1435-88) was both painter and sculptor, and worked in gold, bronze and marble. He made some interesting statues of children and some groups of a religious character. One isolated grand work stands out among his more mediocre attainments—a statue in bronze of Colleoni on horseback at Venice. This has been called the finest equestrian figure in the world. You will see a picture of it on page 4614.

Desiderio (1428-64) was a worthy pupil of the great Donatello, and he founded a kind of minor school of sculpture whose influence was long felt. He and his followers worked chiefly in marble, and were most praiseworthy in their generation for carving little tombs, reliefs, portraits, busts of children, sweet-faced madonnas—the kind of sculpture to be found in every fifteenth-century church of any note in Italy; the kind of sculpture we are inclined to take for granted and pass by because it bears not the superscription of a great name.

The most important of Desiderio's followers were Mino da Fiesole, Antonio Rossellino and Benedetto da Majano. Rossellino made a most lovely relief called the Nativity, which is in a church in Naples; and there also is Da Majano's Nativity.

Siena produced, among many minor sculptors and artists, the fine sculptor called Jacopo della Quercia. He lived from 1371 to 1438; his work was strong and realistic, much thought of by the artists and sculptors of his day.

One of Della Quercia's earliest works was a set of sculptures for the Happy Fountain in the chief place in Siena. The original adornment of the fountain had been a statue of Venus dug up in the neighborhood of Siena, probably a relic of Græco-Roman art. When troubled times came upon the people of Siena it occurred to them that their heathen goddess might have something to do with their disasters. So they took the happy goddess from the Happy Fountain and adroitly buried her in the territory of Florence, their chief enemy. When peaceful days came again the men in power in Siena asked Jacopo della Quercia for a new ornament. The sculptor, taking a lesson from the past, made the Happy Fountain most thoroughly Christian. He sculptured for it a number of beautiful statuettes, including figures to represent the Christian virtues.

JACOPO DELLA FONTE, OVER WHOM TWO CITIES QUARRELED

For the rest of his life, in tribute to the fine work he had put into this sculpture, Jacopo was known as Jacopo della Fonte.

Another early work by him is the lovely tomb of Ilaria del Carretto, now in Lucca Cathedral. Later he made some fine reliefs for the doors of the Church of San Petronio at Bologna. The day came when Jacopo was sorry he had undertaken this commission, for the folk of Siena and Bologna quarreled hard about him. In the end he was threatened by the authorities of his native town with a fine of one hundred gold florins if he did not return at once. Jacopo hastened to return, being, like most artists, too poor to pay such an enormous sum, and was at once threatened with another fine of one hundred golden florins if he should leave Siena without permission and before a certain bronze relief was done for the cathedral.

Those were days, you see, when men cared so much about a piece of sculpture as to quarrel about it.

WHOLE FAMILIES WHO WON FAME IN THE REALMS OF ART

Most of Jacopo's time was spent between Siena and Bologna, making statues, reliefs and monuments. Among those sculptures are a number of reliefs for the inside of the door of the church at Bologna. These are unequal in merit, but in part show the sculptor at his best. The subjects are taken from the Old Testament.

One of the most interesting features of fifteenth-century Florentine art was the existence of whole families who worked together as painters or sculptors. It often happened that one member was worthier of fame than the rest. This was true of the Rossellini, of whom Antonio surpassed his elder brother Bernardo. Another artist family was the Majani, of whom Benedetto was the chief. The most remarkable family in many ways were the Della Robbias. The work begun by the first, Luca della Robbia (1399-1482), was carried on by his nephew and his sons.

The Della Robbia sculpture was of a distinct kind and formed a tradition of its own which lived in Italy a long time. Luca began, like most sculptors, working at small heads and portraits and reliefs. His most important work, before he started making the glazed terra-cotta which we think of as the true Della Robbia craft, was the carving in marble of the organ-gallery front in the cathedral. This was opposite the singing gallery sculptured by Donatello. In these competitive works we can see the essential difference between Donatello and Luca: Donatello chiseled his cherubs in forms of strength and vigor; Della Robbia gave his a harmonious grace which was the keynote of all his work.

Next came some commissions for the Campanile—five reliefs, and two altars, only one of which was finished, and the work on the bronze gates of the sacristy. Then Luca, by a happy inspiration, gave up marble sculpture and devoted himself to that kind of glazed terra-cotta work which made him famous throughout Europe. There are many stories told concerning his invention, and it is difficult to say how much is hearsay and gossip and how much is truth. The fact re-

mains that Luca succeeded in covering his clay models with a kind of enamel that not only gave them color, but protected them from atmospheric injury.

In this painted sculpture Luca's peculiar and harmonious compositions found a perfect medium. His art was never lofty and profound; it was concerned with the day-to-day story of the gospels, angels and madonnas who seem a little nearer to us than the great conceptions of more austere sculptors.

THE BEAUTIFUL TERRA-COTTAS THE DELLA ROBBIAS MADE

A very lovely circular enamel of the Madonna and Child is in the Cluny Museum in Paris. A relief of this same subject, which Luca was never weary of showing, is in the Convent of San Marco in Florence. But this is only one of many specimens of the art of the Della Robbias in their native city. The Florentines took a delight in introducing this colored ornament into the churches and convent chapels. Indeed, Luca was given commissions from all over Europe. Andrea, his nephew, took up the family tradition and carried it on with dignity, although his later works show some loss of strength and a leaning toward sentimentality.

A craft so delightful and lending itself so much to decorative ornament, was sure to find imitators. There were followers of the Della Robbias, but they lacked the gifted touch of the family.

About this time Andrea and Jacopo Sansovino were working. Andrea's best-known work is a very fine tomb in a church in Rome; Jacopo's a fine Bacchus in the Florence Museum.

There is something in the story of Italian sculpture that reminds us of a procession with music. All kinds of figures pass by. There is a sweet, tinkling sound of bells and a flute—that is Luca della Robbia; Youth marches along, with banners flying and drums beating—that is Donatello; ghosts of the past slip by, and dear figures out of Bible story. And always we feel there is something more coming; we look along the swaying lines and see presently the last fine figure, hear the last great music, and we say, "Hail, Michelangelo!"

THE COLOSSAL ACHIEVEMENTS OF THE MASTER ARTIST

There is a quality almost terrible in this master's work. Florence, his native city, and Rome were the scenes of his

labors. Echoes of the sculpture and painting he did in those cities sounded all over Italy, and made thoughtful men, patrons of art, pass in review the statuary they had considered greatest in the land.

Michelangelo's sculpture was different from the rest of Italian sculpture in three ways—he saw men as giants; he saw them as solitary, mournful giants weighed down by Fate; and he saw these giants as creatures whose mere bodies could furnish the most magnificent lines Nature has created. All the work of his prime shows this threefold characteristic. His work was, in the literal sense of the word, extraordinary ("beyond the ordinary"), sometimes unnatural. It was as grand and impressive as a ceaseless seventy-miles-an-hour gale; or an organ always sounding the full diapason; or a father who never ceased by night or day lamenting those he had lost.

We know that, most mercifully, life and nature do not exist on this exalted plane. If a March storm makes havoc, we may be sure the day is coming when we shall spy the first violet, and smile.

FIGURES OF THE HUMAN FORM THAT MICHELANGELO FASHIONED IN STONE

One cannot easily imagine Michelangelo as taking notice of the first violet. But he might have seen someone dart and stoop to pick one; and the muscles suddenly set into play thereby would have filled him with a kind of frenzy, a passion for the twisted lovely shapes of the human body at that moment.

He would have gone home in a fever of impatience to make an image in stone that would forever hold that moment's posture. And when he had done so, the figure carved would have become mysteriously sorrowful and fateful; it would have become a symbol of a magnificent huge person, who ought to be lifting the world about, stooping to the ground for a trifle. Whereas, as we know, the man was merely picking the first violet to show his baby girl at home.

As we have already said, Donatello had a better influence on posterity than Michelangelo because he was saner. When a sculptor saw a Donatello statue, something fine and strong and natural in it made him feel a distaste for his own little mannerisms. But when a sculptor saw a Michelangelo statue or painting—and the painting was really statuary in line—he was so lost in admiration of its

unearthly twisted grandeur that he would likely go and get a model to contort himself into a position that he could not hold five minutes without fainting, and then the sculptor would begin to model his figure on the same lines. The result was a weak study in anatomy filled with the most copyable of Michelangelo's mannerisms.

THE WONDERFUL GENIUS WHO STANDS APART FROM ALL OTHER MEN IN ART

And this emotion, this twisted grandeur which the poor imitator struggled so hard to express, was achieved by Michelangelo because he could not help it; he thought that way, felt that way, had just such visions. He abhorred the very idea of imitating anything himself. He simply hewed marble according to his own ideas. We see, now, that he was a great genius, but a bad master. Instead of founding a school he founded a company of imitators of his mannerisms. He stands apart; being unique, he should not be taken by everyday people as a model.

We know that part of Michelangelo's time was given, under protest, to painting wall-pictures at the pope's command, but he insisted that he was a sculptor. His earliest relief dealt with a classical story—the battle of Hercules and the centaurs. When he was only eighteen he hewed a marble Hercules about seven and a half feet high.

A little later he was ordered to Rome, and one of the first things he carved was a Pietà—a figure of Mary with the dead Christ—which is now above the altar in one of the chapels of St. Peter's. A Madonna and Child carved by him is now at Bruges.

THE YOUNG GIANT DAVID, THE MEDICI AND A MIGHTY MOSES

The next great work was the immortal David, at Florence, carved by this genius out of a colossal block of marble with nothing to guide him save a tiny wax model he had made. The David showed what Michelangelo could do; this huge, lanky, undeveloped lad, with the head of a Greek god, filled Florence with amazement and is now one of her chief treasures. You will find pictures of the statue on pages 65 and 68.

The most wonderful and memorable work, after the David, are the tombs for Lorenzo and Giuliano Medici. There is a lofty grandeur in this work. The figure of Lorenzo bears no resemblance to

the Medici prince: it is a great being meditating profoundly and is called "Il Penseroso" (the thinker). Both the tombs are ornamented by recumbent figures of Day and Night, and these, again, are images of powerful thought, as you may see on page 1743. Neither of these tombs was entirely finished, and two other Medici tombs which had been ordered were never made.

A magnificent tomb for one of the popes was designed by Michelangelo, but the plan fell through owing to the changeable moods of the patron. Later on the sculptor returned to a less extensive plan, and directed the work. The only sculpture for the tomb which he actually finished is the mighty figure of Moses. It is now in the Church of St. Peter in Vinculis, in Rome. Among the works for this tomb, which he left unfinished, are two figures of slaves, and these alone—twisted, savage forms—would be enough to show his peculiar genius. They are now in the Louvre. It was such works—the Moses, quivering with God's anger, the David, the painting of the Last Judgment in the Sistine Chapel, and the unfinished slaves—which had an almost stupefying effect upon the artists who saw them. Michelangelo, as he found expression in his sculptures and frescoes, was, in himself, one of art's revolutions. He was the last great Florentine, the last great sculptor of Italy. His life lasted from 1475 to 1564, but his art has no period.

THE MEN WITH WHOM CLEVERNESS TOOK THE PLACE OF GENIUS

After him came a number of men in whose work cleverness took the place of genius. There were also a few artists gifted in a smaller way, like Cellini, who was almost a wizard in craftsmanship, and Giovanni da Bologna, a Frenchman by birth who worked in Italy. Giovanni's best figure is the Mercury taking flight, in the Florence Museum.

A hundred years after Michelangelo a sculptor was at work, Bernini, whom the people hailed as another Michelangelo. This judgment shows how far Italy was from her prime. Bernini was born in Naples and made a number of statues, all full of gestures and tricks, and lacking the essential poise of great sculpture. He was the chief artistic influence in Rome in his day, but it was a Rome which had forgotten her greatness.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 4699.

SCULPTURES OF ITALY'S GOLDEN AGE



GIOVANNI DA BOLOGNA'S STATUE OF MERCURY TAKING FLIGHT



A PANEL OF THE PULPIT AT PISA, BY GIOVANNI PISANO



A DONATELLO GROUP OF HAPPY CHILDREN



FIGURES FROM THE SINGING GALLERIES OF LUCA DELLA ROBBIA AND DONATELLO



A GROUP OF VIVID CHORISTERS FROM DELLA ROBBIA'S FAMOUS SINGING GALLERY



VIVACIOUS LITTLE FIGURES IN THE PANEL OF DONATELLO'S SINGING GALLERY



A LITTLE CHILD, BY ANDREA DELLA ROBBIA



FETTERED SLAVE, BY MICHELANGELO



A BEAUTIFUL PULPIT, BY GIOVANNI PISANO



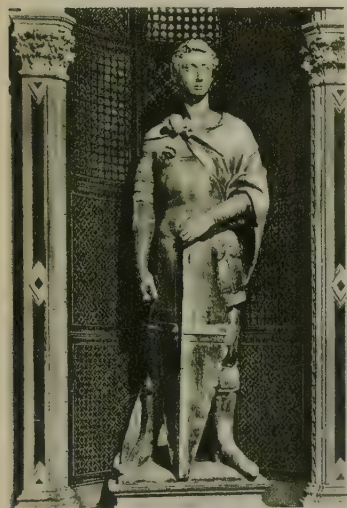
THE VISITATION, BY ANDREA DELLA ROBBIA



A COLORED TERRA-COTTA, BY GIOVANNI DELLA ROBBIA



MORE DANCING CHERUBS FROM DONATELLO'S SINGING GALLERY



DONATELLO'S
ST. GEORGE



JOHN THE BAPTIST, BY
BENEDETTO DA MAJANO



MICHELANGELO'S HUGE
STATUE OF MOSES



THE MADONNA WITH CHRIST AND ST. JOHN,
BY MICHELANGELO



THE PIETA, MICHELANGELO'S GROUP IN
ST. PETER'S



ÆOLUS. BY GIOVANNI BOLOGNA



DONATELLO'S DAVID



VERROCCHIO'S DAVID



THE FAMOUS COLLEONI STATUE IN VENICE, BY VERROCCHIO



A YOUNG CHILD'S HEAD,
BY DONATELLO



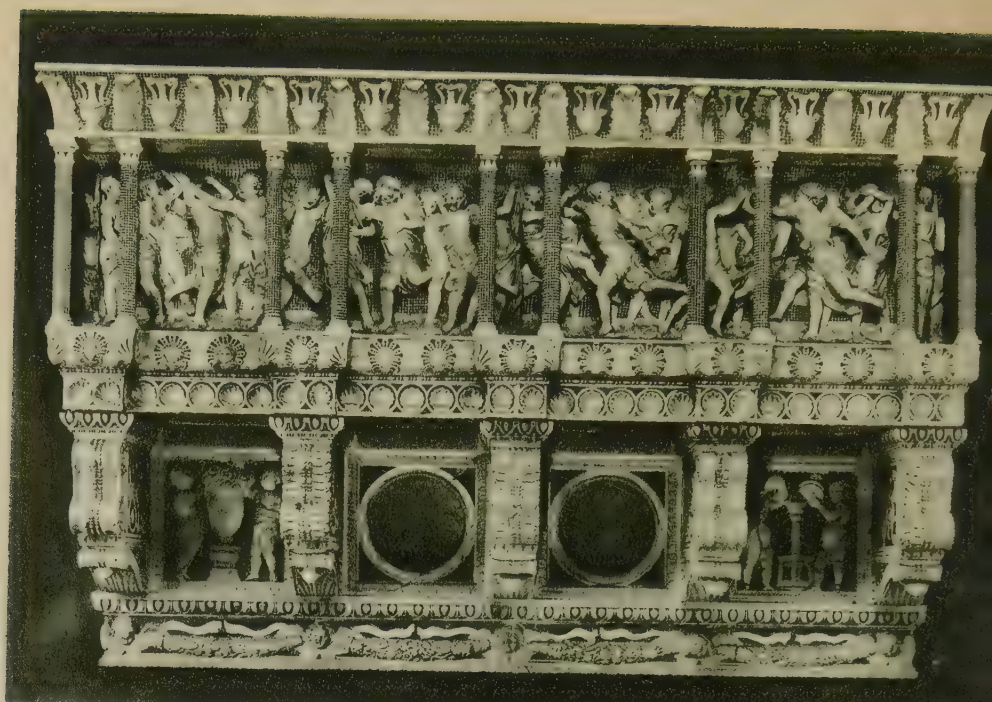
MICHELANGELO'S LORENZO
DE' MEDICI



AN ANGEL, BY LUCA DELLA
ROBBIA



THE GATTAMELATA STATUE AT PADUA, BY DONATELLO



DONATELLO'S SINGING GALLERY IN FLORENCE



LUCA DELLA ROBBIAS SINGING GALLERY IN FLORENCE

These pictures are reproduced by courtesy of Messrs. Alinari, Anderson, Brogi, Manselli, and others.



USING THE CAMERA OUTDOORS

PHOTOGRAPHY is one of the most interesting of all hobbies, for it enables us to keep a pictorial record, that is, a record in pictures, of the places we visit during the holidays, and of anything that happens to us or to those around us.

Most cameras made nowadays can be loaded in daylight. This does away with the necessity of going to a dark room every time we want to put in a new roll of films. In loading a box-camera, we place it upon a table, and unlock it by turning the nickel catch to the right, as shown in picture 1. This releases the winding key, and allows the door at the back to be opened. The film is placed in the clip on the right side of the holder, as shown in picture 2. Now we pass the black paper across the opening and in front of the flap, and insert the end of the paper through the slit in the empty reel, as shown in picture 3. We place the spool in position, close the camera, and turn the key until the number 1 appears at the littlered window. It is now ready for us to take photographs.

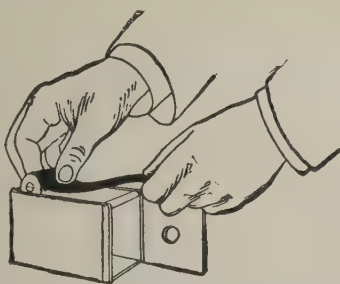
If we wish to take outdoor pictures, we must observe

certain principles in order to have good results. In landscape photography we must have one main object in the picture that exceeds all others in interest. For example,

CONTINUED FROM 4502



1. Unlocking the camera.



2. Inserting the film into the camera.

a bit of cloud, a vessel, a single tree, or some one object that attracts the eye will add to the interest of the view. A second principle we must remember is not to divide the picture exactly in the middle by the horizon line. We should try to give a larger portion of the picture either to the sky or to the land.

It is well to have a roadway or path in the scene to direct the eye from the foreground gradually to the distance. A stream of water catching glimpses of light or reflection of trees, will serve the same purpose of leading the eye into the picture.

A camera does not see pictures in color as we do, but it sees everything in black and white, or masses of light and shade. It is the light shining upon things and creating shadows that makes the photograph for us. We must not point the camera toward the sun if we wish to get a good picture. If the sun is shining directly into the camera, the lens must be protected at the moment of exposure by holding the hand or a piece of cardboard above the top of the lens or a little to one side to shade it.



3. Fixing the black paper in position.

The camera must be held

motionless and also level. If the camera is tipped up, the vertical lines in the picture will meet at the top; if it is tipped down, the lines will meet near the bottom.

THE BONES AND ARTERIES OF OUR BODY

A SECOND LESSON IN FIRST AID TO THE INJURED

CONTINUED FROM PAGE 4267

IF we are going to be successful in rendering first aid to the injured, it is essential that we should know something about the human body, particularly about the positions of the various bones and arteries. In fact, without a pretty accurate knowledge of where the various arteries are, it would be almost impossible for us to stop a person from bleeding to death who was really seriously injured by having a large artery cut. But when we have once learned where the arteries are to be found, we know exactly where we should apply the pressure that will stop the bleeding.

First of all, it is important that we should know how the skeleton is made up, and the picture on this page will help us a great deal. We can find the various bones in this picture, and then feel where most of the bones are in our own body. The skeleton is really the framework upon which our body is built up, and in it there are more than two hundred bones, each of which has its proper name. The bones form the supports and the levers of the body. We ought to learn the names of the more important of the bones.

The head, including the face, is formed of twenty-two bones, all joined together and fixed, with the exception of the lower jaw. The head is made up of a front bone, called the frontal, a back bone, called the occipital, which means simply "back of the head," two bones forming the crown, two forming the sides, and two more the base, or floor, of the skull. Then in the face there are fourteen separate bones, including the jaws, but we need not mention these in detail.

The second great division of the body is the trunk and of this there are two parts—the chest, or thorax, and the lower part, or abdomen. Running right down the whole length of the body from the skull to the extreme end of the back, through the thorax and abdomen, is a long column of small bones joined together by cartilage, which is elastic enough to allow the body to turn from side to side, and bend forward or backward. This column has twenty-four bones altogether, and its proper name is the vertebral column, or vertebrae. These names come from a Latin word, which means "to turn." The vertebral column is also called the spine, or backbone; but of course it is not really one bone but twenty-four. The bones are hollow rings, and right down the middle of the column runs the

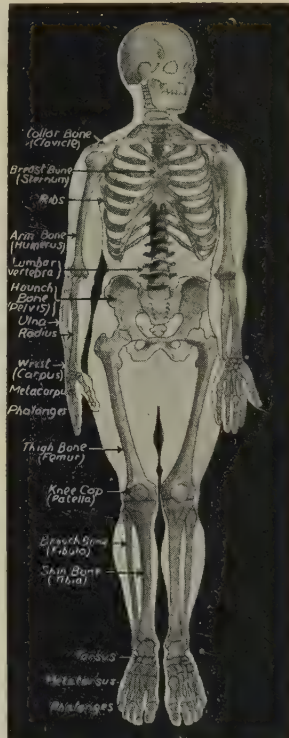
spinal cord, which is really a continuation of the brain. Some of our nerves run from the brain and some from the spinal cord.

The chest, or thorax, is like a cage, with part of the spine forming the back, the breast-bone, or sternum, which means breast, forming the front, and twelve pairs of curved bones, known as the ribs, forming the sides. Inside this cage are some of our most important organs—the heart and the lungs. The part of

the skeleton in the abdomen is known as the pelvis, which is a Latin word meaning "basin." It consists of several bones, the best known of which is a large irregular bone that comes from the back right round to the front, and the upper part of which is generally known as the hip-bone. In children this large bone is in three parts, with cartilage between to allow for growing, but in grown-up people it is all one hard bone. On each side of this bone is a socket, into which the ball-like head of the leg-bone fits, and is able to turn about when we walk, jump, dance, bend, and so on.

The other bones of the skeleton are known as the extremities, the upper extremities being the arms and the lower the legs. The arms are joined to the trunk on each side by a shoulder-blade, or scapula, and by a collar-bone, or clavicle, which means a key, and the bone is so called because it is supposed to be shaped like a key. The collar-bone can be felt on either side of the neck like a rod. Its outer end joins the shoulder-blade. The upper bone of the arm is called the humerus, which is the Latin word for "shoulder," and this reaches from the shoulder to the elbow. It is joined to the two bones of the forearm—the radius, or outer bone, and the ulna, or inner bone. Ulna is another Latin word, the meaning of which is "elbow."

The bones of the hand are made up of those of the wrist, the palm, and the fingers. There are eight little bones, arranged in two rows of four, forming the wrist, or carpus, then there are five bones called metacarpus, which means "between wrist," because they come between the wrist and the fingers. They form the knuckles. The finger-bones are aptly termed phalanges, and there are three in each of the fingers and two in the thumb. The word phalanges is really the plural of the Greek phalanx, which means battle-line, and the name was probably given because all these little finger-bones when arranged and working in



THE BONES OF OUR BODY

Here we see their exact positions in relation to the body.

proper order suggested a well-disciplined army.

The bones of the leg correspond with the bones of the arm. There is the large upper, or thigh, bone, called the femur, which means thigh. This is jointed to the two lower bones, the large tibia, or shin-bone, outside and the thinner fibula inside. The leg has what the arm has not—a little plate of bone laid over the joint of the upper and lower bones. This is the kneecap, or patella.

The bones of the foot are very much like those of the hand, and, indeed, the French call the toes the fingers of the feet. In place of the wrist there is the tarsus, or ankle; in place of the metacarpus there is the metatarsus; and then there are the phalanges, or toe-bones, two in the great toe and three in each of the others.

We now come to the arteries. The organs that are engaged in that most important work of circulating the blood through our bodies are the heart, the arteries, the capillaries and the veins. The heart is like a large pump, that pumps the pure blood into the arteries; these, again, are lesser pumps, that pump it into small vessels called capillaries. The word capillaries is from the Latin word for "hairs," and the name is given because the vessels are so very fine that they are like hairs. The blood, having now become impure, passes into the veins, and is carried back to the heart, to the side opposite to that from which it was pumped out. It is then pumped up into the lungs, where, by our breathing, it receives fresh oxygen, and gives up its carbonic-acid gas, thus being purified. By the heart and arteries it is then pumped through the body once again, and so the process continues.

It is essential that we know the position of the principal arteries, as arterial bleeding is by far the most serious. We can learn from the picture on this page the positions of these arteries, and it also shows us the places at which pressure has to be applied in order to stop bleeding. It should always be remembered that blood coming from an artery is scarlet, while blood coming from a vein is dark red. The blood from an artery comes out in spurts, while vein blood flows smoothly.

ARTERIES OF HEAD AND NECK

The carotid arteries, right and left, pass up on each side of the windpipe, and then divide into branches which supply the brain and head. The facial artery crosses the lower jaw, and sends branches to the chin, lips, cheeks and nose. The temporal artery can be felt in front of the upper part of the ear. The occipital artery is behind the ear, and carries blood to the back of the head.

ARTERIES OF THE UPPER LIMBS

The subclavian artery can be felt pulsating if the finger be passed over the collar-bone at its inner end and pressed downward and backward, the shoulder being pressed down with the free hand, so as to bring the artery up nearly to the finger that is feeling for the pulsation. The axillary artery is a continuation of the subclavian, and can be felt if the fingers be pressed into the armpit while the arm is raised well away from the side. The brachial artery is an extension of the axillary artery, and runs down the inner side of the biceps muscle to the front of the joint in the hollow of the elbow. Its course may be roughly seen by looking at the inner seam of the coat. The brachial artery divides at the elbow into the radial and ulnar arteries, which course down the bones after which they are named to the wrist. At the wrist we can always feel the beating of our pulse, which is the blood passing through the radial artery. From the wrist it branches out into the hand and fingers. It forms a curve in the hand, called the palmar arch.

THE ARTERIES OF THE TRUNK

The aorta, which is the largest of all the arteries, is in the thorax. It arches up from the heart and then descends into the abdomen, where it divides, to the right and to the left, into what are called the iliac arteries.

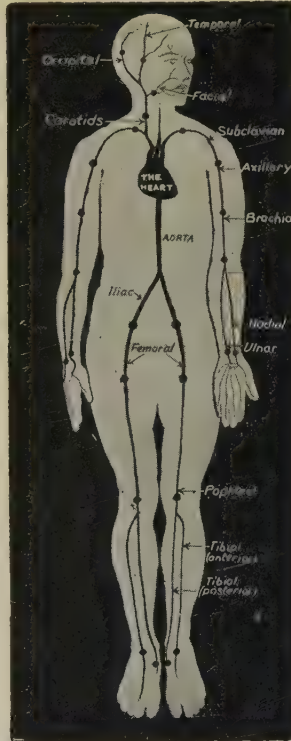
ARTERIES OF THE LOWER LIMBS

The femoral artery is a continuation of the iliac. It enters the thigh in the middle of the groin, where its throbbing may easily be felt, and passes in a winding line to the back of the knee, where it is called the popliteal artery. There it divides into two branches. One passes down the back of the leg as the posterior tibial artery to the inner side of the ankle, entering the sole of the foot as the plantar arteries. The other branch—the anterior tibial artery—passes forward between the tibia and fibula, and runs to the instep and the space between the great and fourth toes. At the instep it is called the dorsal artery of the foot. Passing over the tarsus to the sole, it forms, with the plantar arteries, the plantar arch.

In learning the positions of the bones and the arteries we should practice placing our hands upon the right positions in our own bodies.

The pictures on this page and the preceding page show very clearly the bony and arterial structure of a human being. The illustration on this page also shows the pressure points. We should know these by heart.

The next lesson in first aid is on page 4732.



THE ARTERIES OF OUR BODY

The spots show where, in case of injury, we press to stop bleeding.

HOW TO MAKE TEA TILES OF CLAY

YOU are told how to make useful dishes of clay by two different methods on pages 5199 and 5200. Now you may learn how attractive tea tiles are made from this same material. First decide upon the size and the shape of the tile. The round tiles shown in picture 1, and the square tiles shown in picture 2, were made 6 inches in diameter and 6 inches square respectively. You will find it more sat-

moistened with a sponge or cloth and placed away to dry. When thoroughly dried the surface pattern is first traced on transparent tracing-paper and then made ready for transferring to the tea tile by blacking the lines of the design. The pattern is transferred by placing the paper on the tile with the blackened lines next to it and then tracing them over from the opposite side.



1. DESIGNS FOR ROUND TEA TILES



2. DESIGNS FOR SQUARE TEA TILES

isfactory to fill in the decoration for your tile on paper before you begin to work the clay.

A lump of rather stiff clay is then kneaded and flattened out into a thin layer a little larger than is needed to make the tile. The layer of clay is then placed on the top of any level surface and is worked gently to the desired thickness. A knife or clay tool may be used to trim the outer edge or edges to the round or square shape planned. The clay thus shaped is next worked carefully to be certain that any unevennesses are removed before the whole piece is

If you have not already decided upon the exact colors for the design, you will find it necessary to decide whether you prefer to have a dark pattern on a light ground or a light pattern on a dark ground. The tile can then be colored according to this scheme of dark and light. The natural color of the clay can be used as the light in the design and blue, green or red underglaze color will serve for the dark. As explained in the previous articles, the piece is then covered with a colorless glaze and fired.

THE PUZZLE OF THE TREES IN THE PARK

A GENTLEMAN who had a fine park found one day that a storm during the previous night had blown down a number of his trees, and so he telegraphed to a nurseryman to send down 24 young trees that might be planted in place of those which had been destroyed.

When the trees came the owner of the park told his gardener that he wanted the 24 trees planted in such a way that there would be 28 rows, each containing 4 trees in a straight line. The gardener thought the gentleman had made a mistake in the number of rows, so he asked him again how the trees were to be planted. The gentleman repeated that he wanted 28 rows of 4 trees each, and the gardener insisted that this was impossible with 24 trees.

"Why, you will need 112 trees to make 28 rows of 4 trees each," said the gardener, wondering what made his master so silly.

"Come into my study," said the gentleman, "and I will draw a plan for you, and you will see exactly how I want the trees to stand. It is quite easy to get 28 rows with only 4 trees in each row."

The gardener followed the gentleman to the study, and in a moment or two the gentleman had drawn his plan, when the gardener owned that the task which at first had seemed quite impossible to him was very plain and simple. How were the trees planted? The gentleman's plan showing the 28 rows is given on page 4734.

THE GAME OF TENNIS

TENNIS is an outdoor summer game, which is becoming more popular every year among both boys and girls. Only two or four players are needed for a game, and it can be played on the garden lawn if the latter is sufficiently large and level. If we are not fortunate enough to possess such a lawn, we can play in the parks, most of which have specially prepared and marked-out tennis courts, with nets provided. Should we wish to use our own lawn, the grass must first be cut quite close to the ground and well rolled. The court is then marked out with straight white lines about 2 inches wide, in accordance with the plan and the measurements in the illustration.

It is not necessary for the beginner to pay a very high price for a racket, but he must see that the strings are taut, and the handle comfortable to grip. Its weight should be 12 ounces for a boy or girl of thirteen, and it should balance at the screw. A game between two is called a "single," and a game played by four is called a "double."

We will first deal with the "single" game. Before starting, the net must be raised to the height of 3 feet in the centre, and the players should toss for choice of side or service. If the winner chooses the side, the loser serves, or the winner may elect to serve, and then the loser chooses the side. The object in the game is to hit the ball into our opponent's court so as to make him fail to return it into our own court. Every time he fails it adds to our score, and every time we fail it adds to his score. The server must succeed, too, in hitting the ball over the net into the service court in one of two strokes, or his opponent scores a point.

The first point won counts 15, the second 30, the third 40, and the fourth a game. When both players reach 40 it is called "deuce," and a player does not add a game to his score until he wins two points in succession, the first being won when the ball is served from the right-hand court, and called "vantage in." It is "vantage out" if he loses the first point, but "deuce" again if he wins the next point. The server must stand behind the base line to the right of the centre, and throwing up or dropping the ball with the left hand, according to whether serving overhead or underhand, strike it with the racket before it reaches the ground, so that it shall fall in the right-hand service court on the other side of the net. Should the ball fall into the net, or outside the service court, the service is called a fault, and he tries again. If this service, too, does not fall into the service court, the receiver scores a point.

The receiver should stand somewhere near his base line ready to hit back the ball while in its first bounce. In this first stroke he is only allowed to hit the ball in this way, but after this stroke both players may hit the ball before it bounces, or "volley" it, as it is called. If the player lets the ball bounce a second time, his opponent wins the point. The receiver may return the ball into any part of his opponent's court, and the server, in returning it, may this time hit it into any part of the court. The two players hit the ball to and fro over the net to each other until one fails to return the ball within the opponent's court.

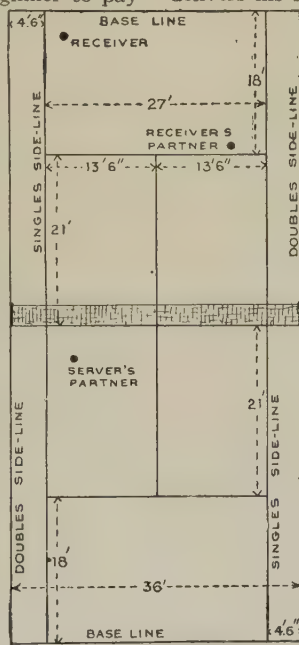
When the first 15 is lost and won, the server delivers his second service from the left-hand side into the service court diagonally opposite him, and the receiver also moves to his left-hand side.

On the completion of the first game the receiver becomes server, and the players serve in turn until one of them gains six games, which count as one set. Should both players court five games, they may decide to play on until one of them is two games ahead of the other.

It is most important that we should hold our racket correctly. For serving and hitting the ball when on our right hand—the forehand stroke—we should grip the racket firmly at the end, the button just projecting beyond the little finger. For hitting a ball coming to our left—the backhand stroke—it is best to move our thumb so that it points along the length of the racket, and with some players the latter is slightly twisted round in the hand. The essential thing to remember, however, is that the centre of the racket should meet the ball at right angles.

There are two ways of serving, the underhand and the overhead. In the easier underhand service the racket should be held firmly in a straight line with the hand and arm from the shoulder, and swept like a pendulum by the right side of the player, hitting the ball, which must be dropped into its path from the left hand. The movement should not stop immediately the ball has been struck, but the racket should follow the ball's path. It should, indeed, be a general rule in playing that the bat follows through its stroke, as much more certainty is given to the stroke, and a much freer action is thus gained.

In the overhead service the racket is carried behind the head, the shoulder being back and down; the ball is thrown up above the right shoulder about three or four feet, and the racket is then swung over so that the centre of the racket hits the ball as high above the head as possible. The left foot should point to the net,



Plan of a tennis court.

and the right foot should be almost at right angles to it, and the body should also be slightly turned away from the net. The greater weight of the body, which at first is on the right foot, becomes transferred to the left as the ball is hit. The racket should always follow through toward the left knee. We should rather make the mistake of sending the ball over the service line than hitting it down into the net. A ball falls naturally, and we should first endeavor to hit at a spot about a yard or so above the top of the net. The power of imparting twists, swerves and screws to the ball comes naturally to most players after a few months' practice, and is obtained by drawing the surface of the strings across the ball as it is being hit. The server should make certain of sending an accurate second service, should the first one be a fault. Variety of pace and placing should be aimed at more than mere fast pace.

The opponent, or receiver, should stand at the distance behind the service line where he expects, from experience of the server, that the bouncing ball will have begun to drop to the ground. He should avoid having to hit the ball as it rises to the top of its bounce. Half-volleys in tennis are the most difficult balls to return, and to be forced to take a ball on the half-volley is generally a sign that the player is in a wrong position—his aim should be to avoid having to play this stroke. He should be satisfied with getting the service, especially a hard one, back with a good length, that is to say, to fall near the base line. Every player should hit the ball with a firmly held racket, keeping his arm as free as possible. His racket should meet the ball rather than let the ball meet the racket. He should be sure to time the ball accurately, and put weight into his stroke from his shoulder and body, and he should keep his eye on the ball until it is right on the racket. If his opponent is running up to the net, it is good policy to lob or hit the ball gently up over his head and out of his reach. Beginners should hit the balls after they have bounced, and make sure of a good length and accurate direction.

In volleying, the beginner should always try to take his low volleys with the head of the racket above the wrist, and to get his feet in the right position, thus: for a low forehand volley his left foot should be forward, for a backhand volley the right foot should be in advance. For overhead volleys very careful watching is necessary, and any easy balls hit as hard as possible so as to "kill" them.

In play we must always aim at hitting our balls well out to the base lines rather than hit them gently just over the net. We must always remember, too, to start at once for our ball, and not to wait until it is over the net before going to it.

In tennis we must learn to be very nimble indeed, and to recover our balance and position at once, especially when we have run back to take a lob over our head. Finally, to play well, it is absolutely necessary in such a quick game as tennis to concentrate one's whole mind on the game, and never to play slackly for an instant.

There is no difference in the scoring in a "double," but a larger-sized court is used, and the side lines of the single court are only used as boundaries to the service courts. Partners serve in turn thus: W and X are playing Y and Z. W serves, then Y, then X, and lastly Z. Z stands in the right-hand court for W's first service, while X is on W's left. For the second point W changes sides in his court with his partner, X, and serves from the left-hand court to Y. On the completion of the game W stands to the right-hand side of the court to receive Y's first service. Only the server and his partner change their positions. In "doubles" it is the object of each pair of partners to beat the opposing pair, and they must help each other to this end as far as possible. It is best to decide that each should have the balls that come on his side of the centreline. Another way to play, which is not quite so useful, is for one player to take the balls that fall near the net, and his partner those that fall near the base line.

THE PROBLEM OF THE TRAVELER'S DINNER

A LONG time ago two Arabs who were traveling to Bagdad stopped at a small village for their midday meal. One of them had 5 loaves of bread with him and the other only 3. Just as they were about to begin eating, a stranger came up and, saying that he had money but no food, asked if he might share their meal. He promised to pay for what he had, and so the two travelers agreed to divide the loaves equally among the three, and invited him to sit down.

After the meal was over and all the food had been eaten, the stranger laid down 8 coins of equal value in payment for the food he had eaten, and, bidding his hosts good-by, went away. The traveler who had 5 loaves took up 5 of the coins as his share, and left 3

for the man who had had 3 loaves. But this man disputed the division of the money and insisted that he should receive half of it.



The men began to quarrel very bitterly, and as they could not agree they went before the magistrate, so that he could decide who was right. The magistrate listened attentively to the story which the men had to tell, and then, to the astonishment of both, and of the people standing by, he said: "Let the man who had 5 loaves take 7 of the coins and the man who had 3 take only 1; that will be a fair division of the money." Was his decision just? The explanation which he gave will be found on page 4735. If this

problem is given to a group of people to work out, few will have it right.

MAKING A COLLECTION OF ROCKS

WE read all about the crust of the earth upon which we live on page 525 of this book and on the pages that follow, and it will be a recreation that is both entertaining and instructive to form a collection of rocks and fossils. These will provide literally "sermons in stones," for every stone, dumb as it may seem, has a story to tell and a lesson to teach.

WHAT THE COLLECTION SHOULD CONTAIN

In making a collection of stones and rocks, we should aim to have every layer of the earth's crust represented. There should be specimens of the rocks formed by the action of fire, rocks formed of material deposited by water, pieces of those parts of the earth's crust formed by layers of vegetable matter, like the coal measures; and then we should have as many varieties as possible of fossils—that is, creatures that lived in a bygone age and have been turned into stone and thus preserved. Then, wherever we keep our collection of stones, we should always try to keep them in their right order—that is, according to the age when formed or, what usually means the same thing, the depth at which they were found.

WHERE TO OBTAIN SPECIMENS

Specimens of many rocks are not difficult to obtain. We may find many specimens lying about on the seashore when we are away on a holiday—and it is astonishing what a variety of rocks may be gathered together in this way in the course of a few years—granites, limestones, sandstones, serpentine, quartz, madrepore, or coral, and so on.

Then we may sometimes find a specimen we are wanting on one of the roads of our cities or towns. Some years ago a boy who belonged to a geology class saw in a macadamized road that had recently been relaid with stones, though not yet gone over with the steam-roller, a piece of interesting rock called mica-schist. Stooping to pick this up, he found by its side another rock called gneiss, and then a fossil, half imbedded in rock. This aroused his interest, and he picked up another and another until all his pockets were full.

Having shown his fellow-students the fine geological collection that he had secured in this unusual and unexpected way, it was not long before thirty or forty boys were wandering up and down the road picking up stones here and there, and filling their pockets. This went on for several days, until at last a policeman was stationed at the place to guard the road. Probably it was the first time that the guardian of the law had had to protect the road itself from being carried away. Of course the wholesale removal of a macadamized road is not recommended, but by keeping our eyes open, even in the streets of our towns, we may often come across a specimen well worth adding to our collection.

TOOLS FOR OBTAINING MINERALS

Naturally, the specimens that teach us most, and that will in after-years be of most interest to us, are those that we actually chip out of

their rocky bed in some quarry or cutting. For this purpose we need quite inexpensive tools—simply a good steel hammer and a strong chisel of good quality. In selecting the hammer, we should see that the head is broad and thick at one end and that the other end is wedge-shaped. A hammer of this kind is quite indispensable to the geologist, and it will be found to serve its purpose far better than a hammer of any other shape.

When we secure a specimen we should chip it into a convenient size and shape and wrap it up in a piece of paper, upon which we should write the place in which it was found and the date when found.

There are many places in which we may chip out our own specimens—railway-cuttings, road-cuttings, quarries, mining works, brick-pits, and so on; and the workmen at these places will be found to be generally very civil, and willing to assist us in securing specimens. If we are living or staying near any of these works, we can often induce a laborer to save us anything interesting that he comes across in the way of fossils, and we can learn from the men where fossils are most likely to be found in the district.

HOW TO KEEP THE SPECIMENS

On arriving home after an expedition we should sort out our newly obtained specimens, write a neat little label for each, bearing the name of the place where it was found, the name of the rock, and, if we know it, the geological name of the formation, or the layer of rocks, from which it came, and paste each label upon the specimen to which it belongs.

To serve as cases for our rocks and fossils, if we have no proper cabinet at home, we can obtain flat wooden boxes for a few cents from the grocer or druggist, or make flat trays with rough compartments to hold the specimens, which as a rule should not be larger than a big walnut.

No region in the world will afford a more varied collection of minerals or of fossils than North America, especially if the collector happens to live among the mountainous parts of New England, or along the Alleghenies; the whole country is a sort of geological museum, for the strata, or layers of rock, in the crust of the earth have been so broken and heaved, and then so ground down on the crests of the ridges, that the edges of almost the whole series of strata are sometimes exposed to view. This is still more true of the Rocky Mountain region, where thick masses of strata stand almost upright against the mountains which have been thrust up through them like wedges. Then, too, the rivers have cut deep trenches through the strata in some places, so that you can see just how they lie, and of what they are composed.

But it is also possible to collect many varieties of minerals and rocks even in the prairie country, by studying the pebbles and boulders which have been left there by the ice of the Glacial Period—a matter you will need and want to read about the moment you become interested in your subject.

A SHORT-WAVE RADIO RECEIVING SET

YOU were told how to build a satisfactory long-wave receiving set on page 335. As some boys prefer to experiment with short waves, which have been found to exceed the best results of long waves on various occasions, directions for making an effective short-wave radio receiving set are given. This receiver can be constructed in a few hours. The following materials which are needed to build this receiving set should cost about ten dollars.

- 1 panel 12 inches by 7 inches
- 2 five-plate condensers
- 1 tube and socket
- 1 rheostat
- 1 grid-leak and condenser, 1 to 2 megohms and .00025 (microfarad)
- 1 choke coil

12 binding-posts
1 single-circuit phone jack
1 set of basket-weave tuning coils

The two variable condensers are mounted across the centre of the panel with the rheostat between them. Eight binding-posts are mounted across the top of the panel. The phone jack is in the lower left-hand corner. The tube socket, grid-leak and condenser, and choke coil are mounted on the back of the panel. The remaining four binding-posts, which serve as "A" and "B" battery connections, are also mounted on the back of the panel. All apparatus should be crowded together with as short leads as possible. Five-plate condensers can be obtained by removing plates from standard variable condensers until only five remain.

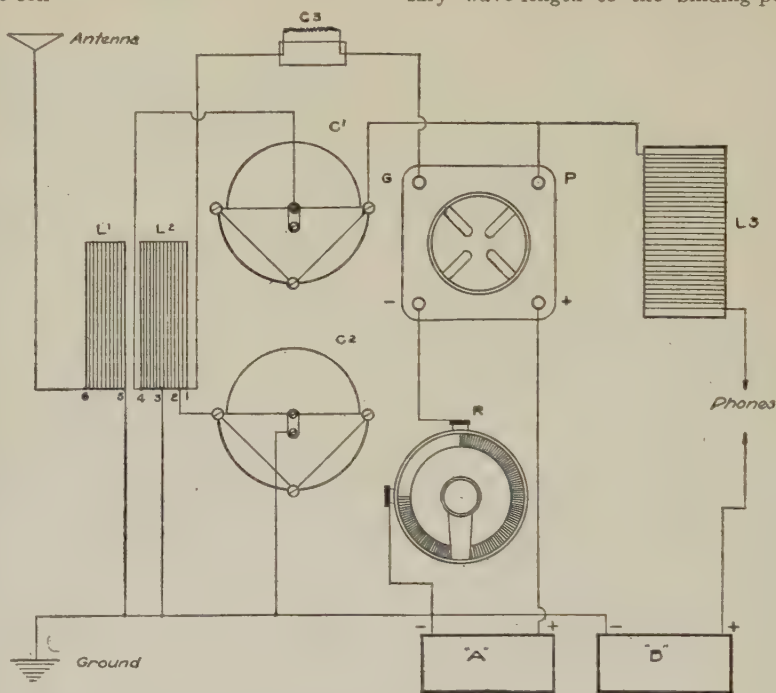
Either a UV201-A or a UV199 tube can be used. The UV201-A tube requires a 6-ohm rheostat and a 6-volt storage "A" battery. The UV199 uses a 30-ohm rheostat and three dry cells in series for the "A" battery. Use a 45-volt "B" battery in either case.

The choke coil is made by winding a layer

of No. 30 DCC wire for 100 turns on an insulated tube 1 inch in diameter and a little more than 3 inches long. Five basket-weave tuning coils will be needed. They are all wound of No. 16 DCC wire. For 20-metre work the antenna coil should consist of 5 turns; the tuning coil of 9 turns, tapped at 3 and 6 turns. For 40-metre work the same antenna coil can be used, but a tuning coil consisting of 18 turns, tapped at 6 and 12 turns is needed. For 80-metre work an antenna coil should consist of 10 turns, and the tuning coil of 36 turns, tapped at 12 and 24 turns. These coils are wound in and out of eleven pegs in a 3-inch circle. Tie the completed form with thread.

To use the set connect the coils for the necessary wave-length to the binding-posts upon

the front of the set in the way shown in the hook-up diagram. The hook-up indicates the way in which these coils are connected. The set should then be grounded in the usual way, preferably to a water pipe. Either an outdoor or indoor aerial



Hook-up diagram for short-wave receiving set.

consisting of a single wire hung vertically and not horizontally should be used. Total length of aerial and wire should not exceed 35 feet, and it may be even as short as 8 feet. If desired, a two-stage audio-frequency amplifier can be connected in this set in the usual manner.

If the directions and hook-up diagram are carefully followed, you should have a short-wave receiving set that will exceed the best accomplishments of the long-wave receiving set under ordinary conditions. For long-distance receiving it has been found that a short-wave broadcast is more easily picked up than is a long wave. A boy in the middle western states kept in touch with an arctic expedition by using a short-wave set. In time short-waves may displace long ones.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 4731.



Otsego Hall, Cooperstown, New York, the home of James Fenimore Cooper.

AMERICAN LITERATURE TO THE CIVIL WAR PART I

THE years that came immediately after the adoption of the Constitution brought no real gain to American literature. Many men and women wrote plays, poems, essays and novels, but before the year 1810 only one man really deserves mention. He was Charles Brockden Brown, who was born in January, 1771, in Philadelphia, where he died in February, 1810. He is best known by four novels: *Alcuin*, *Arthur Mervyn*, *Edgar Huntley* and *Wieland*, which were popular in his own time, but are now seldom read, although Sir Walter Scott and Shelley both admired them.

At the beginning of the nineteenth century American literature was a dreary waste of imitative work which showed scarcely a spark of originality. But a new national feeling was making itself felt, and before long someone was sure to find a way to voice it; to express it with the ease and smoothness and culture of the English writers who had been copied for so long, and to combine with it something of the national characteristics that were already becoming well marked.

One of these was a peculiar sense of humor, and it is interesting to note



that the first really important book produced in the new nation was a humorous history of New York as a Dutch colony. The supposed author of the book, Diedrich Knickerbocker, was invented by Washington Irving, who is called the founder of American literature. He was born in 1783, in New York, where his father was a merchant. His mother was the daughter of an English clergyman. His own life makes a story as interesting as many of those he wrote.

The greater part of his education was obtained at home, for ill health in his boyhood kept him from school and college. In 1806 he became a lawyer, but soon went into partnership with his brothers, who were merchants. Just at this time the beautiful young girl to whom he was engaged died, and her death caused him so much unhappiness that he never married.

Still, his sense of humor was not destroyed, and two years later, in 1809, he wrote *The Knickerbocker History of New York*. The book is written in a perfectly serious way, and the historical facts are true, but for the most part it is pure fun. It marked Irving as a really original writer, and

was the first American book that was looked upon in Europe as literature. When it was written, Irving had no idea of making literature his profession, but nine years later, when his firm failed, he took to his pen as a means of making a livelihood and began to write charming tales of English life, humorous and gently satirical essays and short stories. At the time of the failure he was in England, where he had gone after the War of 1812 to represent his firm. He remained in England for twelve years, and during that time he wrote some of his best books. In 1819 he published *The Sketch Book*, which included *Rip Van Winkle*, *The Spectre Bridegroom*, and *The Legend of Sleepy Hollow*—three legends of the Hudson River and the Catskill Mountains, which were received in America with acclaim and awoke Americans to the beauty of their own country.

The *Sketch Book* was followed by *Bracebridge Hall* and *Tales of a Traveler*. Then came Irving's appointment as secretary to the American minister at Madrid. It was a golden opportunity of which he made the best use in the study of ancient books and documents, from which he drew the *Life of Columbus*, a fascinating *History of the Conquest of Granada*, and *Legends of the Alhambra*. During part of the time he was in Spain he actually lived in the Alhambra itself, and so was able to gain the spirit of the place.

From Madrid he was sent to London, where he spent three years at the Legation, and in 1832, after his return to America, he made a long journey through the West and showed his interest in the vast spaces he traveled over in *A Tour of the Prairies and Astoria*.

In 1842 he was back in Spain as minister to Madrid, and when his term of office there was over he settled down at Sunnyside, his house at Tarrytown, on the Hudson, where he wrote a delightful biography of George Washington, which is also valuable as a picture of the time in which Washington lived. This book, the last of his works, was completed before his death, which took place in November, 1859.

While Irving wrote with more ease and grace than any other American of his time, he was not a great writer, but he was an original writer; and though he owed much to his study of Addison and

Goldsmith, and has been compared to Goldsmith and Lamb, his writing is distinctly American in a way. By reading his works we see for ourselves the difference between him and the English writers to whom he is compared.

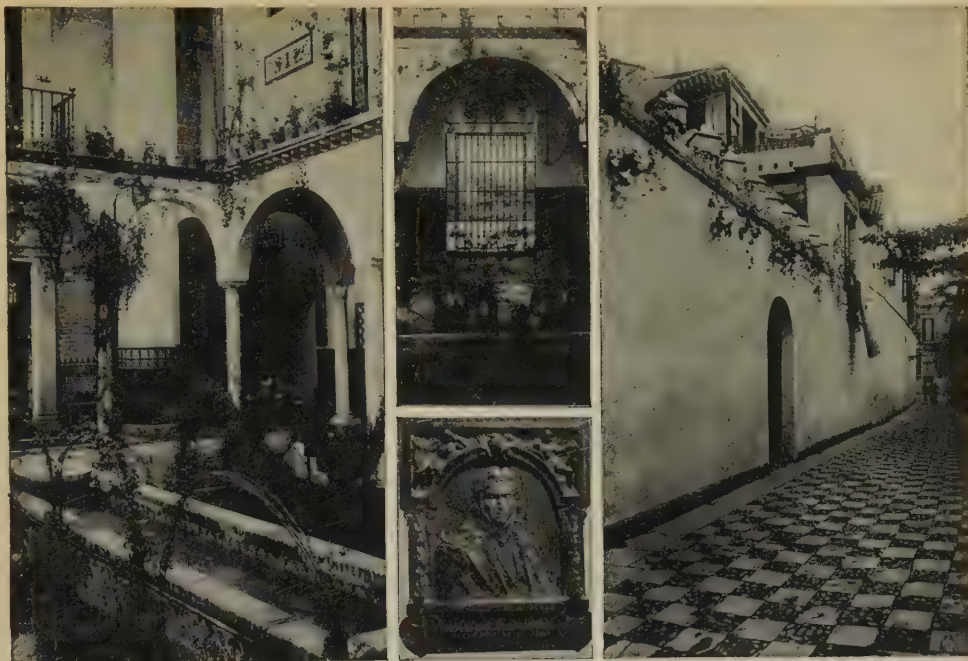
JAMES FENIMORE COOPER, A GREAT STORY-WRITER

We might almost describe Irving's great contemporary James Fenimore Cooper as the historian of the primeval forest, for he lived on its borders in his childhood, loved it as a home and has described it as no one else has done; and to this we must add that he was one of the greatest story-writers the world has ever seen. He was born in Burlington, New Jersey, in 1789, but when he was about a year old he was taken to Lake Otsego, in New York State, where his father, Judge Cooper, the founder of Cooperstown, owned a vast tract of land. That part of the state was still covered with mile upon mile of forest in which Indians roamed and wild animals abounded, and at an early age the boy learned the woodlore and gained the knowledge of the pioneers and the Indians which he used in his great romances.

When schooldays came he was sent to Albany, and at the age of thirteen he entered Yale. He preferred roaming through the fields and woods to attending classes, and as a consequence was dismissed from college in his second year. His father then sent him to sea, and after two years before the mast he got a commission as midshipman and served in the navy, chiefly on the Great Lakes, from 1808 until 1811, when he resigned and got married.

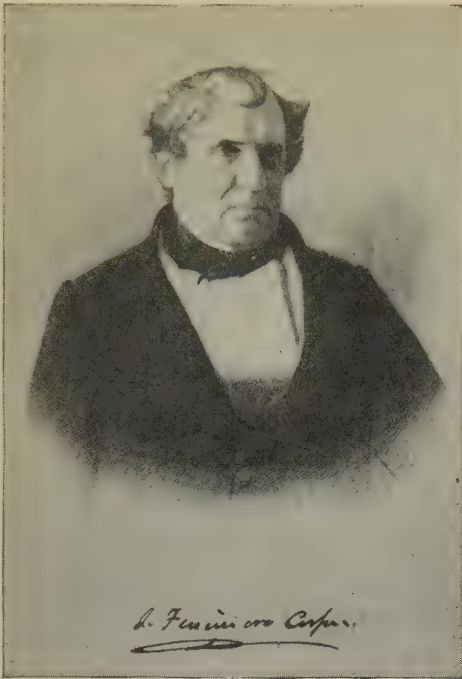
All this experience was of the greatest value to him when he began to write. He had no idea, however, when he left the navy, of writing even one book, much less a whole series; but one day he declared contemptuously that he himself could write a better book than the one he had been reading. His wife dared him to try, and he wrote a story of English life which is so poor that it is better forgotten. He had failed chiefly because he knew little about England. Then he turned to his own country and wrote one of his best books, *The Spy*, a tale of the Revolutionary War, in which the character of the hero, Harvey Birch, is built on the story of a spy in Washington's service. It was a great success, and he

IRVING MEMORIAL AT SEVILLE



Photo, Serrano.

This beautiful building in pure Seville architecture has been erected in Spain in honor of Washington Irving, whose writings have told us so much of the golden age of Spanish discovery and exploration. Inset is a bronze medallion of the writer. The lower photograph and the upper left show the patio.



went on writing books. Some of them are splendid stories of adventure in the forest or on the frontier, or fine sea tales which gain our attention when we begin to read and make us reluctant to lay down the story before we reach the end. They were eagerly read both in America and in England, and were translated into many European languages almost as fast as they were published.

His best stories are the Leatherstocking Tales, which comprise *The Deerslayer*, *The Last of the Mohicans*, *The Pathfinder*, *The Pioneers*, and *The Prairie*; and three of his sea stories: *The Pilot*, *The Two Admirals*, and *The Red Rover*. The principal character in the Leatherstocking Tales is Natty Bumppo, a simple, honorable man who meets us in *The Deerslayer* as a young hunter in the forests of New York State, and dies in *The Prairie* as an old, old man among his friends the Pawnees. One of the best characters in *The Pilot* is just such another simple man, Tom Coffin, a sailor, who has his counterpart in the White Admiral's servant in *The Two Admirals*.

Cooper was the first to write a sea story, and though there have been many written since his time, it will be hard to find anything better than the three we have mentioned. In *The Pilot*, which he wrote to prove that Scott's Pirate could

not have been written by a sailor, the hero, who goes through thrilling adventures on the coast of England and finally escapes in a terrible storm from overwhelming odds, is John Paul Jones. He is a dark, mysterious stranger to whom the captain pays respect, but the secret of his identity is kept to the end, and his name is not once mentioned.

Although Cooper's stories are romantic, they are all realistic, and the men and women whom he pictures are such men and women as he might have met and have been familiar with. His character-drawing, however, is surpassed by his word-pictures, and in his descriptions of the sea, no one excels him.

In 1826 Cooper went abroad with his family and stayed in Europe for about seven years, during which time he wrote *The Bravo*, one of his best-known books. After his return he adopted a scolding attitude. On the one hand, he was irritated by English and European writers, among them Dickens, who were criticizing America; and on the other, by Americans, for the crudenesses which evoked the criticisms. Besides, he had a lawsuit with the people of Cooperstown about some land. Consequently he lost public appreciation, and did not become popular again until after his death, which took place in November, 1851. He wrote some very poor books in his last years, but in spite of his troubles he also wrote two of his best—*The Pathfinder* and *The Deerslayer*.

A SOUTHERN ROMANCER AND WRITERS OF THE SEA

While Cooper was writing his great tales of sea and land, other writers were emulating him in the same fields. The best of these less-known writers was William Gilmore Simms, of South Carolina, who lived from 1806 to 1870, and wrote tales of the Georgia gold-fields and of Revolutionary warfare in South Carolina. He wrote too much and paid too little attention to rules to write well, yet he produced some stirring tales, such as *Guy Rivers*, *Yemassee*, *The Partisan* and *Eutaw*, all of which were popular in the North. During the Civil War and the troubles which followed it, they were lost to sight and never came into favor again.

In 1840 Richard Henry Dana, Jr., whose father was editor of *The North American Review*, wrote *Two Years Before the Mast*, a good story of the life of a

sailor. Good as it is, it is eclipsed by sea romances written by Herman Melville, who lived from 1819 to 1891. In 1841 Melville went on a whaling expedition to the Pacific, and before he got back to Boston had many an adventure. He was a captive among cannibal South Sea Islanders, was in a mutiny and saw service on a United States frigate. When he returned he wove his experiences into romances of the sea. He wrote many books, but the best are *Typee* and *Moby Dick*. The latter is one of the best sea stories ever written.

WILLIAM CULLEN BRYANT, POET AND EDITOR

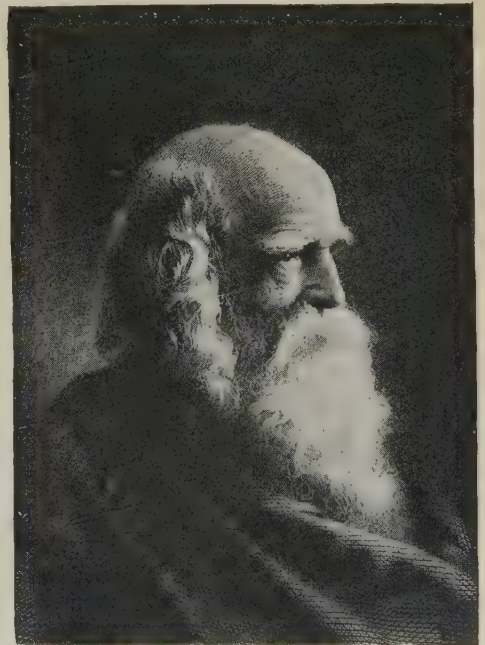
From writers of fiction we must now turn to the poets. During and after the Revolution, Philip Freneau, a New York journalist who wrote many satires, also wrote some charming short poems like *The Wild Honeysuckle*, *The Indian Burying Ground* and *Eutaw Springs*. More important than Freneau were two young men, Fitz-Greene Halleck, who was born in 1790, and Joseph Rodman Drake. Drake, who was born in 1795 and died in 1820, was a physician who wrote only for pleasure, but his *Culprit Fay*, a story in verse about a fairy whose helmet "was plumed of the silk of the thistle down," is a better poem than any that had been written in America before his time; and *The American Flag* is full of patriotism. Halleck, who lived until 1867, is best remembered by *Marco Bozzaris*, a heroic ode which is really good. Still, neither Halleck nor Drake could take high rank, and in the early years of the nineteenth century the prospect of finding a national poet seemed rather gloomy.

In 1794, at Cummington, Massachusetts, a boy was born, named William Cullen Bryant, who was destined to do for poetry in America what Irving and Cooper were doing for prose. Bryant's father, a country physician, was a lover of poetry, and though money was not plentiful with him, he found enough to buy books for his family. Before Bryant was sixteen he had read Pope's *Iliad*, Campbell's poems, Spenser, Southey, Cowper, and Wordsworth's *Lyrical Ballads*. His education was rather unconventional. He had private tutoring and a year at Williams College, and for the rest he wandered through the woods and by the streams. At the age of eleven he had already begun to write verses, and

before he was seventeen he had written the greater part of *Thanatopsis*, the poem which immediately comes to our mind when his name is spoken, and he never wrote a better one. It was not published, however, until 1817, when his father sent it to *The North American Review*.

Meantime he had become a lawyer and actually practiced law for some years. But his love for literature was stronger than his liking for law, and having decided to devote himself to literature as a profession, in 1825 he went to New York with his young wife. Life was not easy for them at first, but before long he became associated with *The New York Evening Post*. He was editor of this paper for fifty years and brought it up to a high standard, which it maintained so long. Through it he gained great influence in the national life, and used this influence unflinchingly on the side of right and freedom and justice.

His life was of course a busy one, and though he wrote until the end, none of his poems is long; they are not very many in number, and his later ones are not greater than those he wrote in his youth. Like Irving, he did not reach great heights, and while he does not rouse us with a trumpet call, his poetry is unflinchingly good. He wrote very noble

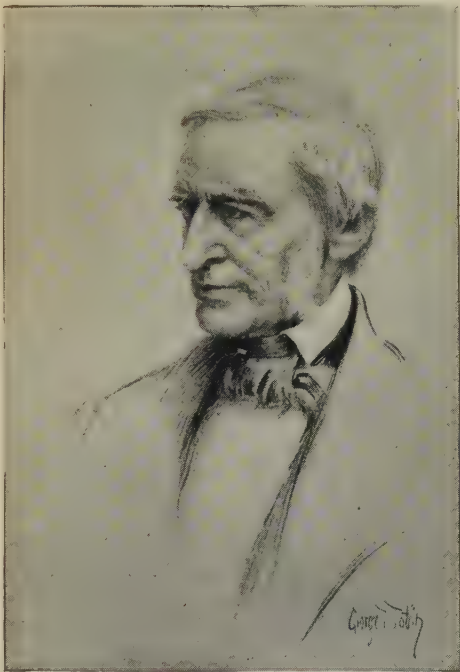


Engraved by C. Burt, after a photo by Sarony.
William Cullen Bryant.

poems on patriotism, of which he struck the first note in *The Ages*, and sang the last in his old age in *Oh, Mother of a Mighty Race*; but his chief themes were nature, freedom and death.

THE SAGE OF CONCORD AND HIS FRIENDS

While Irving, Cooper and Bryant were writing in New York an important literary group grew up in the little city of Concord, Massachusetts, around Ralph Waldo Emerson, who, from his wisdom, became known as the "Sage of Concord." He is the best known of all American



Ralph Waldo Emerson.—From a drawing by G. T. Tobin, by courtesy of Charles Scribner's Sons.

writers except Cooper, and one of the greatest, if not the greatest, among them.

His forefathers had been ministers of the Congregational Church for generations, and his own father was pastor of a Unitarian church in Boston, where he died when Emerson was ten years old. His mother and aunt had a hard struggle to educate him and his three brothers. Ralph entered Harvard at the age of fourteen. After his graduation he taught for a time and then became pastor of a Unitarian church. He married at the age of twenty-nine, but his wife lived only three years, and shortly after her death he left the ministry. Feeling ill

and unhappy, he went abroad to see what a change of scene would do for him, and during his absence he made a good friend in Carlyle.

After his return Emerson went to Concord with his mother to live in the Old Manse. The next year he married again, and as it was necessary for him to undertake some definite occupation, he began to lecture in the lyceums which were then popular, and which did much to aid the cause of education. For thirty years he went up and down through New England and the middle and western states lecturing in these lyceums until his ideals pervaded the thought of the day and became part of the life of the nation.

He wrote some noble poems, but it is by his essays that he is known best. The titles of the essays give an idea of the subjects which interested him: *Manners*, *Farming*, *Books*, *Life and Letters in New England*, *Eloquence*, *Old Age*, *Experience*, *Self-reliance*, *The Oversoul*, *Nature*, *Representative Men*. His address on *The American Scholar* has been called the "Declaration of Independence of American literature." His themes were for the most part manners and morals, taught in language of which James Russell Lowell said, "His rich words, every one, are like gold nails in temples to hang trophies on." In all his work we find words of wisdom. Thus in the essay on *Nature*, he says:

For no man can write anything, who does not think that what he writes is for the time the history of the world; or do anything well, who does not esteem his work to be of importance. My work may be of none, but I must not think it of none, or I shall not do it with impunity.

The group of friends by whom Emerson was surrounded, and their followers in New England, came to be called Transcendentalists, a difficult word used to describe the fact that they aspired to great heights of idealism in thought and life. They were all very earnest and very interesting, but the most important in literature were Amos Bronson Alcott, Margaret Fuller and Henry David Thoreau. Nathaniel Hawthorne joined them for a time, but soon left them.

Alcott is best remembered as the father of Louisa May Alcott, the author of *Little Women*. In his early life he was not prosperous, for, like many of the Tran-

HOMES OF TWO FAMOUS WRITERS



Hawthorne's famous old manse at Concord, Massachusetts, where he wrote his *Mosses from an Old Manse*, a second part of *Grandfather's Chair*, and an enlargement of *Twice-told Tales*. The house was built by Emerson's grandfather and to-day is lived in by indirect descendants of the writer.



The Ralph Waldo Emerson home at Concord, Massachusetts, where the author died in 1882. Here he lived the contemplative life, giving forth at intervals writings which have been a great source of inspiration, not only to his fellow-countrymen, but to the world at large.

Photos, Ewing Galloway.

scendentalists, he dreamed too much and had strange theories of life, and if it had not been for the good management of his wife, the good mother who is so well drawn in *Little Women*, his family must have starved. Later on, after Louisa May Alcott had gained comfort for her family by the sale of her books, her father became more successful, but though his "conversations" and lectures on philosophy were admired in his own time, they are now forgotten except by students of literature.

Margaret Fuller is of more importance, especially as she was one of the fore-runners of the women who brought woman suffrage to pass. She was born in 1810, in Boston, where her father was a judge, and was educated by him in such a fashion that she became quite learned and very critical. For a time she taught in girls' schools and later became editor of *The Dial*, a periodical which was published by the Transcendentalists. At the same time she carried on *Conversations* in literature with groups of women; we would say to-day that she gave lectures to women's literary clubs. In 1842 she was made literary critic for *The New York Tribune*, and though she wrote little besides criticisms, she did a great deal to familiarize the reading public with the best European literature. After a time she went to Europe, and in Italy was married to the Marquis Ossoli in 1847. In 1850 they were coming to America but their ship was wrecked off Fire Island and they were drowned.

HENRY THOREAU, THE HERMIT OF WALDEN

One of the most interesting writers of the time was Henry David Thoreau, who was born in Concord in 1817, and lived there for the greater part of his life. His father, a pencil-maker, was not even well off, but he succeeded in educating his children. Thoreau was graduated from Harvard in 1837, taught for a time, and then learned his father's trade. Later on he became a surveyor, and for a while lived with Emerson's brother William on Staten Island as tutor to his children. He had no desire at any time to make money. All he wanted was enough to live on so that he might study Nature, meditate on it and write, not as a naturalist, but so as to tell others what Nature said to him. In order to do this he built himself a little house in a wood-lot belonging to

Emerson on the edge of Walden Pond. There he lived for two years and a half, reading, thinking, and making notes of the wild life in the woods. The result was a book of essays to which he gave the name of *Walden* and in which he told about building his house and about his hermit-like life there and expressed his thoughts on many things. He had already published *A Week on the Concord and Merrimack Rivers*, and after his death his books on *The Maine Woods*, *Cape Cod*, and some essays were published. *Walden* is his best work, but all his writing has beauty in it. The mountains, he said, are "washed in air," and he described the bluebird as "carrying the sky on his back"; and, again, he speaks of "the faint, flitting, lipping notes" of the chickadees in winter, "like the tinkling of icicles in the grass."

Thoreau died in 1862, at the age of forty-five. During the last fourteen years of his life he lived in his father's house, and made a living by lecturing and by doing a little surveying. But he spent most of his time reading, thinking and writing, or talking with his friend Emerson.

NATHANIEL HAWTHORNE AND HIS MANY STORIES

The next man of whom we must speak, because he was at one time associated with the Transcendentalists, is Nathaniel Hawthorne, whose ideals were as fine and high as those of any of them. He had not Emerson's hopefulness, and instead of teaching self-reliance and self-development, his thoughts were greatly occupied with the sad effects of wrong on the lives of wrongdoers and those about them. Of course we must look for this meaning in order to find it: on the surface his stories are fascinating tales.

Hawthorne was born in 1804 and was the son of a sea captain who commanded one of the fast sailing ships for which New England was so famous. Unfortunately when the boy was only four years old his father died while away on a long sea voyage, and in her sorrow his young mother shut herself away as far as possible from the world. He had two older sisters, however, and his mother's brothers were ready to take his father's place as far as they could, so that his childhood was not unhappy. In 1821 he was sent to Bowdoin College, where he was in the same class as Longfellow, and

Franklin Pierce, who later became president of the United States, was his closest friend.

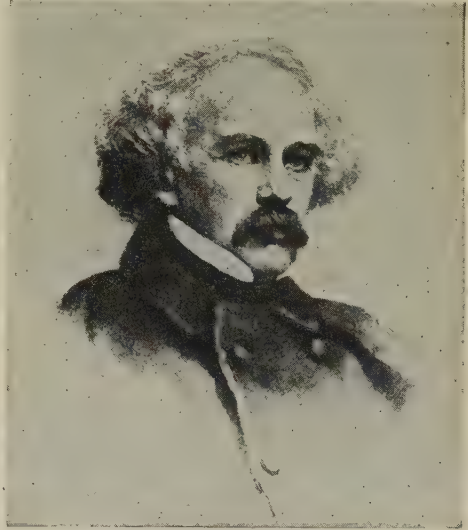
When he left college, instead of preparing for a profession like medicine or the law, he shut himself up in his room and worked there day after day and year after year, writing and rewriting, until at length he was satisfied that he had done something that was good enough to publish.

In 1837 he published *Twice-told Tales*, which drew attention to him as a genius, but were not sufficiently well paid for to enable him to live, and in 1839 he obtained a position in the customhouse at Boston. The work was distasteful, but he endured it until his party went out of office. He then went to Brook Farm, where a group of Transcendentalists were making the experiment of uniting simple farm life with deep study and high thinking. He does not seem to have fitted in very well with the life there, however, and left even before the experiment proved a failure. In 1842 he married Sophia Peabody, of Boston, and went to live in the Old Manse at Concord, where he spent four happy years, wrote more *Twice-told Tales*, and made the old house famous by his *Mosses from the Old Manse*.

In 1846 he was again employed in the customs, this time at Salem, his old home. He lost his position, for some reason, three years later, but when he told his wife of his dismissal she comforted him by exclaiming, "Now you can finish your book!" The book was *The Scarlet Letter*, which is probably the best romance that has yet been written in America, although Hawthorne himself preferred *The House of the Seven Gables*, which he wrote immediately afterward. His next book was *The Wonder Book*, a collection of classical tales that are the delight of children and of many grown-up people. The story of Midas's little daughter, especially, is one of the most beautifully tender and pathetic stories ever written of a child. Then came *The Blithedale Romance*, which is the story of Brook Farm; *The Snow Image*; and *Tanglewood Tales*. We might have had more of these stories, but in 1853 President Franklin Pierce, his old college friend, appointed Hawthorne consul at Liverpool, England, and during the four years that he was consul he published

nothing. After he lost his office, however, he spent some time on the Continent and wrote *The Marble Faun*. In 1860 he returned to America to find the country almost on the verge of the Civil War. He lived through the war, but even before his return from England his health had begun to break down, and he died suddenly on May 24, 1864.

We usually think of Puritan times as being harsh and cold and grim, but there was romance in them for all that, and Hawthorne found it in the histories and journals written in those grim old times, and wove it into stories like those in



Nathaniel Hawthorne—From a crayon by S. W. Rowse.

Grandfather's Chair, and into *The Gentle Boy*, a story of the Quaker persecution; or he describes the bitterness of spirit that prevailed at the time of the Revolution.

This period was the golden age of the orator, and some of the speeches of Daniel Webster, Henry Clay, John C. Calhoun, Edward Everett, Rufus Choate, Wendell Phillips, Charles Sumner and others really deserve to be classed as literature. Few of these men, however, wrote books, and the political questions upon which they spoke have been settled. Few, except students of history, now read their fiery orations, though boys occasionally declaim extracts from some of them. Compared with speeches of the present day they seem rather ponderous and stilted, but some of them deserve to rank with the greatest orations in history.

THE NEXT STORY OF LITERATURE IS ON PAGE 4725.

THE BEAUTY OF THE TREES IN WINTER



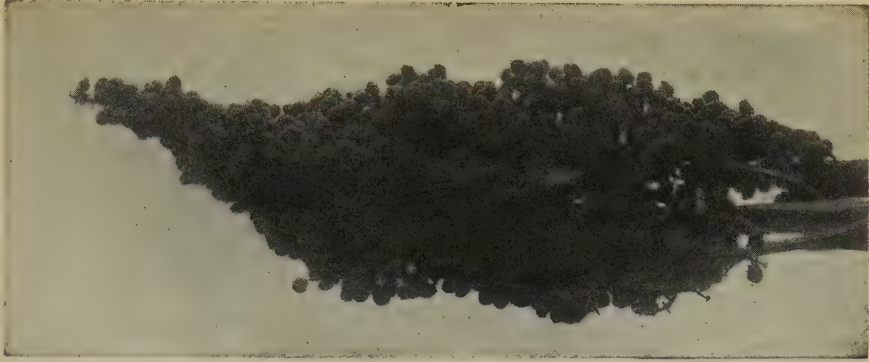
Birches are frequently planted in parks for the sake of their beauty. Their lovely delicate spray is justly appreciated in winter, especially in the weeping varieties, where the twigs are elongated. Some of the American birches grow to a height of seventy feet or over, and the hard wood is valuable for a variety of purposes. The Indians make canoes and articles for household use from the bark of the paper birch.



Hemlocks usually grow on cool rocky hillsides, and sometimes have so slight a foothold that they blow over in tempests. They seem to attract lightning.



The Cedar is one of the most picturesque of our evergreens. Its wood is used for pencils and cigar boxes. It was a sacred tree to many Indian tribes.



The fruit of the sumac.

AMERICAN TREES IN WINTER

HOW many of us can name the trees we see in winter? Yet, if we have ever walked through leafless groves with a skilled woodcutter, we have found that he can recognize the different trees very readily. When the trees are thus crowded together he identifies them chiefly by the bark—the smooth gray bark of the beech, the deeply furrowed bark of chestnut or walnut, the silvery, or golden, or rich brown coat of the birches, and so on.

Even we can see the difference between the pale, smooth skin-like covering of a beech trunk, which always tempts us to mar it with our initials, cut deep with a penknife, and the chalky-white covering of the “silver-vested” birches, that curls back in thin sheets. If we should tear off a strip of this, we should find that it would come away like a ring, leaving a belt of fawn-colored under-bark encircling the trunk. How different both of these are from the ragged fibrous bark of the cedar, from which shreds are continually fluttering in the wind, or from the rough, somewhat scaly bark of the white pine, and the furrowed bark of the chestnut, which reminds us of lattice-work.

When we take our winter walks, it will be amusing to see how many of



CONTINUED FROM 4516

the commoner trees we already can tell by sight. The evergreens, of course, will be the easiest to know. Nearly every park has plenty of them; but we can find several others growing wild in the fields and woods.

THE ODOROUS CEDARS COVER THE CONTINENT FROM SEA TO SEA

The Cedar is perhaps the most common. There are several species known by this name, but they look very much alike, and together they cover this continent from ocean to ocean. We often see young trees, with tightly crowded foliage, and shaped exactly like a paint-brush, standing in rows by fences, velvety-green where the sunshine rests upon them, but almost black in the shadows. The fragrant little leaves, like scales, are wrapped around the twigs, and on some trees, bluish berries nestle among them. These bring the pretty, gray-brown cedar-birds, with their wing-feathers tipped with something precisely like drops of scarlet sealing-wax. They whisper quietly to each other as we pass through the cedars, then return to their feasting on the resinous berries.

Other birds come to the cedars for shelter, and they carry off streamers of the fibrous red-brown bark to weave into their nests. Long, long ago the

Indian, too, learned how to weave the bark into ropes and sandals, although it is short and brittle. When the trees grow in groups, the trunks grow straight and tapering like masts, but when in fields or on the tops of sand-dunes, where the wind blows them roughly, the cedar tree becomes broad and low, and often one-sided—a tree that painters love to draw.

Its rosy wood is very fragrant, and campers delight to throw it on a bonfire so as to smell the odorous smoke. This fragrance seems to be disagreeable to moths, however, so that chests for woolen clothing are made from cedar wood. It is also the best material for cigar boxes. It is so soft and easily cut with a pen-knife that nearly all of our pencils are made from the wood of the odorous cedar.

THE YEW TREE, FROM WHICH BOWS WERE MADE

We have all heard the story of the English Yew, and how it was bent into bows that made English archers famous. It is interesting to discover that on the Pacific coast there is another yew which looks very much like that of the Old World. It has the same flattened spray with rigid leaves, and the tapering cedar-like trunk, which reminds one of a group of slender columns pressed closely together and covered with a purplish, shaggy, fibrous bark. Its wood is tough and elastic, and the Indians have always used it for bows and paddles just as the Europeans did. The Canada yew is only a shrub, and there is another small yew in Florida. If we find a yew tree, however, we must be careful not to chew the foliage, or to eat the seeds nestling in the bottom of a scarlet, fleshy cup, for both are likely to poison us.

THE TALL MAST-LIKE WHITE PINE

There are many kinds of pines, most of them valuable, which grow in America. We generally think of them as furnishing tar, pitch and turpentine (called naval stores), or lumber for many purposes. In fact, this was the reason why the magnificent White Pines of New England were considered to be so important that Massachusetts placed a figure of a pine on her colonial shillings. Maine is called the Pine Tree State and has a pine tree in her state coat of arms.

But only where the white pine grows in an open space do we see it spreading

in the broad pyramid-like form that we think of when we say "shaped like a pine tree." In forests it grows tall and straight, as the lower limbs are killed by shade. It may even reach the height of two hundred feet; and these giant tapering trunks, of firm, compact wood and straight grain, were sought as masts for sailing vessels as well as for many other purposes. Nowadays so many white pines have been cut down that the lumber is rather scarce, and pines with harder wood, or inferior woods, are used in their place.

There are five "needles," as the leaves are called, growing together in each little case, or sheath. This is a point to be remembered. The cones are long and slender, with thin, narrow, shingle-like scales that readily open. These scales (in some pines they are thick and stiff and knobbed) in all pine cones serve as little roofs to shelter a pair of winged seeds fitted into hollows at their bases. When the seeds are ripe and the weather is warm and dry, these pent-house roofs are raised, and allow the seeds to fall out and twirl to the ground. But as soon as the weather becomes damp, the scales slowly shut down, and overlapping, or fitting close, keep the seeds from becoming wet. The scales act also as a protection, or armor, to defend the seeds from the attack of animals. But they are not proof against the clever red squirrel, nor the attacks of certain birds called "cross-bills," that have bills with crossed halves, which look very queer, and as if they would be perfectly useless, but are nevertheless just right for tearing apart the pine cones.

THE SUGAR-PINE OF THE PACIFIC COAST

On the Pacific coast we shall find another pine, quite as large as the white pine, which has a huge cone more than a foot long, but scarcely more than the width of a palm across. Out there the Indians make up nutting-parties to get pine seeds, which they like to eat, and this pine gives them some nuts. It is called Sugar-pine, we are told, because it is one of the several trees with sweetish sapwood, that is scraped off by Indians for a delicacy.

THE GRACEFUL HEMLOCKS MAKE A REFUGE FOR THE BIRDS

Our Eastern Hemlocks do not seem to have tempted anyone to eat them, unless partridges indulge in the tender sprays.

WHITE PINE AND BLACK WALNUT



The White Pine is the most magnificent eastern pine, and formerly grew in great forests in northeastern America. It is being sparingly replanted, and will thrive in light sandy soil. The tree is valuable for tar, pitch, turpentine and lumber. Magnificent forests of white pine covered a large part of Maine—the Pine Tree State—and the tree was placed on the coat of arms of that state. The tall, straight trunks make the best masts for sailing vessels. It is by far the most important forest tree in Ontario.



The Black Walnut in forests has a tall, straight trunk with deeply furrowed, dark brown bark and heavy limbs. The nuts are nearly round, of dusky hue, with a hard shell, with shallow ridges. The tree was so common at one time that the wood was used for fences; but such wasteful methods were employed in cutting it that few fine specimens are left. The tree bears rich nuts in a very hard case, inclosed in a spongy green hull which becomes dry and hard as the nut ripens, and finally falls away.

Heretofore hemlocks furnished much of the cheap, splintery lumber used in house-building, but like all of our other important trees, they have been reduced in number. The use of the bark for tanning has helped.

A hemlock tree forms a splendid refuge for little birds as well as for owls and vicious beasts that prey upon them. Many a ruffed grouse and rabbit has snuggled warm and dry under a low, swinging hemlock branch weighted down by snowdrifts. It is easy to tell the hemlocks. The narrow, little leaves are arranged on two sides of a twig, forming a knife-like spray, and their cones are very tiny. The tree, especially when young, is one of the most graceful of our evergreens.

Young hemlocks are likely to perch themselves on rocky ledges where they seldom get a good foothold for their roots; hence they frequently blow over. They seem to be, also, a special mark for lightning: I have seen a little tree in half a second stripped of all its greenery and branches, while the white core, broken at the top, and still glistening with sap, protruded from the wreckage, standing piteously among its feathery, untouched neighbors.

THE FAN-PALM OF THE ARID SOUTHWESTERN SECTIONS

In the South and West not only the cone-bearing trees but other kinds carry their leaves over the winter. California boasts of its great Fan-palm, one of the few native palms, which sometimes grows sixty feet high, and which is often used in gardens to give a tropical air. The dead and dried leaves of many years droop in a shaggy mass, like a great fringe, beneath the living crown of green fan-shaped foliage.

THE PALMETTO GIVES A TROPICAL AIR TO OUR SOUTHERN COASTS

South Carolina, on the other hand, prides itself on the Palmettos, trees which stand stiff and quaint along her coast, as well as along the coasts of more southern states. Although of no great value as a timber tree, the palmetto has been closely connected with the history of the state. As every school child remembers, a revolutionary fortification on one of the islands in Charleston's beautiful harbor was built of earth and palmetto logs. These are spongy and elastic, and when the British fleet in 1776 bombarded this

fort, the logs received and imbedded the balls without splitting.

The palmetto appears on the state flag of South Carolina—the Palmetto State, and a crooked palmetto rises in the centre of the state's present seal.

During the Civil War the tree with a rattlesnake (apparently twenty or thirty feet long) wound about its trunk was figured on the banner and on the seal of the seceding state. Cockades were made of strips of foliage. Oddly enough, none of these pictures shows the proper palmetto foliage, each leaf of which is shaped like an ordinary palm-leaf fan, split at the edges into slender divisions.

Strips of these leaves are woven with rushes into baskets and various trifles. The bases of the young leaf-stalks, surrounding the solitary bud at the very tip of the trunk, are filled with long, strong fibres. This bud, containing all the growing parts of the tree, is ruthlessly cut out, killing the palmetto, in order to get the fibres, which are made into brush-bristles. The bud itself is cut out by Indians and negroes and boiled as a vegetable—whence the name, "cabbage palmetto."

THE EVERGREEN OR LIVE OAK OF THE SOUTH

Both East and West have evergreen, or "live," oaks in their southern parts. The Live Oak of the southeast is generally draped with quantities of Spanish moss, but that of California displays its dome-shaped head without the hoary veil. The leaves of the latter oak resemble those of holly, and remain on the tree until the new ones appear. The acorns are long and slender, and are eaten by Indians when better ones cannot be obtained.

THE BUTTONWOOD, SO CALLED FROM ITS BUTTON-LIKE FRUIT

Of all the many trees that shed their leaves in the winter there are several that one can learn to know at a glance. Probably the Buttonwood is the easiest to discover, but we must look for it along the banks of streams or in damp places, for although it grows elsewhere, the buttonwood likes to have plenty of moisture for its roots. In fact, it often grows so close to watercourses as to be undermined by them, and then tumbles in, while the great disk of roots rests edge-wise on the bank. This tree can be seen afar, for great flakes of its dingy thin bark fall off, leaving curious white patches



The Sugar Pine is a magnificent western tree with a straight, thick trunk which is sometimes more than one hundred and fifty feet high. Huge cones over a foot long hang from the tips of the branches.



The Washington Fan Palm grows in the deserts of California, and is useful for planting in arid soil. It sends its strong roots far down into the sand in search of moisture.



The Sabal, or Cabbage Palmetto, gives a tropical appearance to the southern coast. The bases of many leaf-stalks remain on the trunk and look as though they had been braided into a thick mat.



The Hornbeam forms a very pretty rounded head with beech-like leaves. Its lower limbs are generally somewhat irregular in growth. The seeds are sheltered by a three-lobed bract in clusters.

of inner bark gleaming on trunk and limbs. Countless balls of seed swing gaily from its clumsy branches through the winter. Toward spring they are broken up, being composed of little nuts, each with a tuft of rusty wool, and the birds help to tear them apart. In the Mississippi Valley the buttonwoods (or sycamores, as they are often called) grow to a great size, but are then often decayed within, only a mere shell of their wood and bark surviving. Early settlers utilized these vast hollow trunks, sometimes ten feet across, for smokehouses, grain bins and the like, and even constructed shelters for themselves, by cutting great pieces of the thin walls of the cavity.

THE SHAPELY HORNBEAM, OR IRON-WOOD

Not far from the sycamore, we may find the small shapely Hornbeam or Iron-wood. Both of these names refer to the extremely white and surprisingly hard wood contained in the slender furrowed trunk. It has many uses. So tough is it that home-made brooms could be fabricated out of fine strips of iron-wood. A "withe will last almost as long as iron wire, and an oxgad . . . is nearly equal to a leather one."

The flexible branches of the European hornbeam, which closely resembles ours, were woven together to make those curious walled and roofed alleys of old-time gardens. Blue beech it is sometimes called, because of its blue-gray bark smoothly stretched over its hard-looking, irregular trunk and limbs, and from the similarity of its foliage and round head to the larger tree. Of course it is not a beech at all.

THE RICH CRIMSON BERRIES OF THE SUMACS

We shall doubtless see some sumacs when we are tramping across barren fields. There is nothing easier to distinguish on account of the cone-shaped masses of berries, each covered with crimson plush, which hold their own bravely during the winter.

In another article we have spoken of the Poison-sumac with its poisonous, dry white berries hanging like grapes. While all are closely related, it is to be remembered that any sumac with velvety red fruit is safe to handle. In fact, one may taste the red plush berries, which are very acid and not agreeable. Chickadees love them, and continue to visit the

spires until they have swallowed all the seeds. In winter we see why the Stag-horn sumac is so called. Its thick awkward, extremely brittle branches have a curve upward not unlike a deer's horn.

THE SHAGBARK HICKORY, FAMOUS FOR ITS NUTS

Probably the Shagbark, that tall handsome hickory which farmers often leave standing in their pastures on account of the sweet-flavored nuts it bears, will be an upland tree that we shall soon espy. If it is a full-sized tree, it will have a rather small and narrow head with a few crooked branches, bristling with smaller ones, pointing more or less upward. The trunk is generally tall, straight and slender, and it looks as if it had been shingled rather badly. Long narrow strips of its gray bark have become loosened at the sides and lower end and are attached only at the top, whence they hang like flaps or "shag." The hickory is famous not only for its seed-kernels, but for its strong, durable wood, which also makes splendid fire wood.

THE SASSAFRAS, KNOWN FOR ITS PUNGENT BARK

In searching for the shagbark, let us not confuse with it the quaint Sassafras. It is also rather tall and straight but has a peculiar crown. The branches look as though they had started to grow to the right, then to the left, then swing back, and so on. The branchlets grow stiffly and crookedly upward, giving an oblong, round-topped outline which curiously reminds one of a many-branched candlestick. The lower bark is deeply furrowed, gray and corky-looking, but the upper and smaller branches are smooth and yellowish green.

The sassafras is one of the trees that grows smaller and smaller northward. In Canada it is almost a shrub. But it is extremely difficult to get rid of, for the merest fragment of root will start growing. These aromatic, warm-tasting, orange-skinned roots are the most valuable part of the sassafras. Probably the colonists learned to include them in root-beer by discovering that the Indians before them had made a drink out of sassafras.

THE WALNUT—A HANDSOME TREE, WITH FINE DARK WOOD

At one time there were many Black Walnut trees scattered throughout the timbered lands, especially in the great forests of the United States. They were

FOUR INTERESTING TREES



The Shagbark is one of the most valuable hickories, both as a timber tree and for fuel. It is sparingly cultivated for its pleasant nuts.



The Sassafras is a quaint little tree of small value for timber. It is aromatic in bark, leaf and root, which are used for drinks and other purposes.



Mesquites spread into wide low domes of finely divided foliage. This species is known as cashaw in the West Indies, where it is found scattered over the dry plains with the spine-girdled palm.



An astonishing amount of the hard, heavy wood of the Mahogany which is found in tropical America is used for furniture. Its beauty varies with its grain and the color of the stain used.

so common, and the wood was so readily split, that people made fence-rails out of them, saving one or two trees somewhere, perhaps, for the sake of the rich nuts. Then there was a call for black walnut as a material for cabinet-work and furniture. Its rich brown, hard and firm wood can be readily polished and is light as well. But the demand for it, and the wasteful ways of the early settlers, caused the larger trees to be entirely destroyed, and we seldom see fine specimens unless they have been saved near houses, or in an occasional pasture. Then we shall find that it becomes a noble tree with broad, rounded head supported by a straight trunk, and wide-spreading heavy limbs, somewhat awkward in their manner of branching. The lack of delicate spray, and the odd, horn-like arrangement of the stubby branchlets, give the black walnut, when leafless, an unfinished gaunt look.

THE SPLENDID HEAD OF THE MAJESTIC WHITE OAK

The White Oak at first glance might be confused with a field grown black walnut, for it also has a splendid dome-like head. But its branches more regularly, is straighter, and is subdivided into smaller twigs. Its immense lower limbs stretch far out, level with the ground and not far above it. It is likely to have many faded leaves clinging to the twigs throughout the winter. They are oval in shape with regularly and deeply indented edges. The bark is rough and pale, and the wood is also light-colored, tough and elastic. One should always be able to tell the white oak either in winter or summer, for it is one of the most valuable of our trees, not only on account of its majestic form, but for its timber.

THE CATALPA'S BEAUTIFUL FLOWERS

A wild-wood tree, that we shall scarcely find growing north of Philadelphia except in cultivation, is the Catalpa, or Indian bean, as the settlers in the South called it, having an idea that the slender cylindrical pods looked like snap-beans, and being in the habit of calling any native object "Indian" this or that, whether the actual Indian had anything to do with it or not. Certainly no Indian had any interest in the "beans" of the catalpa, for they contain nothing but rows and rows of winged seeds overlapping one another and forming a central

rod in the leathery shell. But the pencil-like pods swinging from the twigs all over this ungainly tree, with its short trunk and wide-spreading, not to say sprawling, branches promptly give us a clue to its name.

THE BEAUTY OF THE BEECH AND THE BIRCHES

The catalpas lack that delicate feathering of small twigs that we call "spray," but this is the chief feature of the Elm, the Beech and the Birches. The beech's twigs grow smaller and finer as they approach the ends of the branches and are finished by the long, sharp leaf-buds; but the birches have the most exquisite "spray" of all of our trees, except perhaps that of the American elm. In fact, winter is the best time to see the birches, for then the delicate twigs, too fragile, it would seem, to stand the stormy weather, but really so flexible as to bend before it and thus escape danger, stand out clearly against sky and snow. And, when spring comes, and the yellow-powdered tassels are trembling on the spray, how they are tossed and flung about by the elastic branches, thus scattering the fertile powder to be carried on the wings of the wind. If the birches had no value as timber trees, or oil-producers, or bark-furnishers, for the many uses of the Indians, they would still be of inestimable value as ornamental trees for their spray alone.

Other trees may be recognized in winter by their sprays. Of course the evergreens can always be studied at this time, but trees which lose their leaves can also be named, such as the Pepperidge, with its shelf-like branches closely set with tiny branchlets which bristle in every direction. Then there is the Hackberry, with its fine spray rather like that of an elm but dotted with numerous small, round, dried fruits. Birds eat the thin, sweet flesh. The Dogwood, too, may be known in a moment by its upturned twigs, topped by gray, squarish buds like buttons. Color in the woods appears when the sprays of willow and maples are painted with pale green and gold and rose tints, which proclaim the coming of spring. Certain shrubby dogwoods also wear the spring's livery, but children know best the black and gold of the willow-wands, on which crouch silky pussies under their shell-like tents. The children bring great bunches home.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 4775.

TWO TREES OF PARK AND STREET



The Catalpa is a splendid tree when in flower. The white, purple-spotted corollas are borne in great panicles. The flowers are followed by long green bean-like pods. The leaves are broadly heart-shaped. The wood is fine and smooth, and is used in cabinet work where wood of a light weight is required. The tree is often planted in parks and on city streets, where its handsome flowers make a brave show in July.



This great tree, the Buttonwood, or Sycamore, as it is often called, is sometimes planted, like its European relative, in city streets, where it apparently thrives. In its native woods, the buttonwood sometimes grows to a height of over a hundred feet and usually alongside of streams, into which it frequently falls, blocking the current. A picture of the European plane tree, or sycamore, is shown on page 4395. The true sycamore, however, is neither the American nor the European tree, but is a native of Asia.

THE TREASURE IS FOUND AT LAST



Captain Flint had buried the treasure and then had killed one of his men whom he doubted. Ben Gunn, who had been marooned upon the island, later found and removed the treasure. When Long John Silver, the leader of the mutineers, got possession of the map, the gang made for the spot where the treasure had been buried. While discussing what had become of the treasure they were attacked.



Later Ben Gunn led Jim and the others to the cave to which he had removed the treasure. There were bags and chests which had rotted, and the gold had spilled upon the floor so that one could pick up handfuls of it. It was divided fairly, and then the Hispaniola had a safe voyage to the home port.

Pictures, courtesy of White Studio.

A STORY OF SPLENDID ADVENTURE

TREASURE ISLAND is a boy's tale of adventure, written for boys, with a boy for a hero. Many grown-ups as well as boys and girls read and re-read the story. The story grew out of a map which Robert Louis Stevenson drew and colored one day to entertain his little stepson, Lloyd Osbourne. On the map he marked names at random, and then built a story around this chart. The chart of the island is given as the frontispiece of the book, but its whereabouts in the sea is not mentioned. The story was first published in 1881 as *The Sea Cook*, and appeared in *Young Folks*, a boys' magazine. In 1883 it came out in book form, and has now been made into a play. The pictures show some scenes from the play. Long John Silver is the villain of the story.

TREASURE ISLAND

FIFTEEN men on
the Dead Man's
Chest—

Yo-ho-ho, and a bottle
of rum!

Drink and the devil had done for
the rest—

Yo-ho-ho, and a bottle of rum!



man turned up and
forced Jim to lead
him to the captain's
room.

He dropped something in the
captain's hand and then has-
tened away. They heard his
stick go tap-tapping into the

distance.

"You have till ten to-night," read the captain. "Ten o'clock!" he shrieked, and sprang to his feet, but then reeled and fell with a heavy thud to the floor. Jim called his mother, but nothing could be done for the captain—Billy Bones was dead.

Jim and his mother rushed to the village for assistance. But no one would venture to the inn, for the name of Captain Flint filled them all with terror. However, they gave Jim a loaded pistol, and offered to go for armed assistance. Alone, the two returned to the inn, and ventured into the parlor, where lay the body of the dead captain. There on the floor near his head was a piece of paper with a black spot, and around his neck hung the key to his treasure-box.

Snatching the key, Jim hurried to the box, opened it, and found on top trinkets, pistols and sticks of tobacco. Underneath was a canvas bag filled with gold, and a bundle tied up in oil-cloth. His mother snatched up the bag and took from it the amount the captain owed her. Jim picked up the oilskin packet and concealed it in his

A rugged old seaman, with a sabre-cut on his cheek, sang his favorite song again and again, and the Admiral Benbow Inn, in a little English village, echoed and re-echoed with the chorus. When he was not out upon the cliffs scanning the sea with his brass telescope, he was sitting in the corner of the parlor near the fire. Sometimes he called for his rum. When Jim Hawkins, the innkeeper's son, brought it to him, he sang his old wild sea-songs in his high, quavering voice.

"Jim, my lad," he said one day, taking the boy into his confidence, "keep your weather-eye open for a seafaring man with one leg." Then he told Jim thrilling tales of storms at sea, and of the wild deeds on the Spanish Main. Especially he spoke of Captain Flint, a pirate.

On one occasion Dr. Livesey, the village physician, warned the old seaman to stop drinking rum or he would die. The sudden appearance of a sailor named Black Dog and the fight between them caused the captain to have a stroke. He told the doctor and Jim that old Flint's crew were after his sea-chest. Several days later a blind

breast. Frightened by footsteps in the distance, they hastened away from the house.

Breathless with fear, they saw a group of eight men, led by a man with a lantern, dash into the house. They heard them running to and fro, overturning the chairs and tables in their search. Finding that someone had been through the sea-chest, the blind man, Pew, told the others to find the boy Jim Hawkins.

They scattered to search, but at the sound of a pistol-shot, evidently a signal, all the pirates rushed away. Only old Pew was left behind, begging them to save him. As he turned, bewildered, some horsemen bore down upon him. He was struck by the flying hoofs, and moved no more. The riders proved to be revenue officers.

Jim rode to tell Dr. Livesey the news and handed him the oilskin packet. This contained a map and other clues to Flint's treasure, which was buried somewhere on an island far away.

The doctor, Squire Trelawney and Jim studied the map of the island. It showed three crosses, and beside one was written: "Bulk of treasure here." The squire decided to fit out a ship to seek the pirates' treasure. With him he would take the doctor and Jim.

Ready for the voyage to Treasure Island, the treasure ship, the *Hispaniola*, stood at the dock. Long John Silver, an old one-legged sailor, had offered to provide the crew. In a few days Silver got together a company of the toughest salts imaginable. Jim was wild with delight at the prospect of going to sea—going with a piping boatswain and singing seamen—going forth to seek buried treasures on an unknown island.

Waiting at the tavern for the ship to sail, Jim chanced to see Long John, and decided that he was the one-legged sailor whom he had been told to watch for at the old Benbow. There also he noticed Black Dog, the man with two fingers missing, who had visited the inn. Silver pretended not to know that Black Dog and Pew, the blind man, had been buccaneers. Jim was suspicious, but he was soon lost in admiration of Long John and his parrot, as the sailor told him stories of ships and seamen and taught him nautical phrases. Captain Smollett became suspicious when he found that the crew knew of the treasure-hunt.

Long John Silver, in spite of his crutch, commanded respect from all the sailors. With his parrot, Captain Flint, perched on his shoulder, he would jump along on his crutch as nimbly as any other man could walk. Every man on board worked well, and all was quiet until the last day of the outward voyage. That evening at sundown Jim went to get an apple from a big barrel on the deck. He heard voices talking in excited fashion, and jumped quickly inside the barrel.

So hidden, Jim heard Silver telling the story of his connection with Flint and the other pirates. Silver planned to steal the treasure map and then put the non-pirate party to death.

Just then the voice of the lookout shouted "Land-ho!" There was a great rush of feet across the deck, and the sailors hurried away.

Jim rushed from his hiding-place as all hands came on deck. Captain Smollett was issuing orders to anchor on the south side of the island. He showed Long John a chart, a copy of the original found in Billy Bones's chest, complete in all details, with the single exception of the red crosses and the written notes. Long John's eyes burned as he took the chart, but he was doomed to disappointment. The next morning the *Hispaniola* was anchored, and orders were given to lower the boats. The crew began to growl over the work. Fearing serious trouble, the captain decided to let the men go ashore. So Silver and thirteen of the crew embarked. With a loud cheer they took to the boats, thinking to get at the treasure before the others could locate it.

Jim foolishly slipped over the side of the ship and concealed himself in the nearest boat. The crews raced for the beach. When the boat Jim was in reached the shore, he jumped out and plunged into the nearest thicket. Silver spied him, and shouted after the lad, but he only hurried on and ducked out of sight.

Some hours afterward Jim heard a bustle among the bulrushes and recognized Silver's voice. He made out that Silver was trying to persuade one of the honest hands to mutiny. Upon his refusal, Silver whipped the crutch out of his armpit and hurled it at the sailor, knocking him down. Then, agile as a monkey, the old pirate jumped at the fallen man and killed him.

Silver picked up his crutch, and blew a whistle which summoned the desperadoes. In mortal fear, Jim dashed out of the thicket and ran in the direction of the boat and away from the murderers. As he sped along he heard a sound, and turning, saw a shaggy dark figure leap behind the trunk of a pine. In terror of this new apparition he pulled out his pistol. The wild figure hesitated, then fell on his knees and held out his clasped hands in supplication. This was Ben Gunn, a former member of Flint's crew, who had been marooned on the island for three years. He offered to tell the secret of the hiding-place of the treasure for a thousand pounds and a passage home.

Meantime the doctor and the squire learned that Jim had gone ashore with the rest. So they hastened to provision a boat and went ashore in quest of information. Leaving one man with a loaded pistol to guard the six sailors on the ship,

the others made for the stockade which had been erected by Flint and his party. When they had entered the fort, they saw seven of the mutineers coming toward them. The squire and the doctor fired, and in return ball after ball whistled around them.

"Where do you suppose Jim is?" said the doctor. Just then someone pounded at the door and shouted: "Doctor! Squire! Captain! Let me in! It's Jim!"

Then Jim rushed breathless into the stockade, and was warmly welcomed by the faithful party. He told how he had met Ben Gunn and how he and Ben were interrupted in their talking by the shots. Ben disappeared, and Jim rushed down to the shore, where he saw the ship still at anchor, but flying the black flag of piracy. Then cautiously he had crept to the stockade.

An account of the next appearance of Silver we give in Jim Hawkins' words.

SILVER'S FLAG OF TRUCE

THE rest had long been up, and had already breakfasted and increased the pile of firewood by about half as much again, when I was awakened by a bustle and the sound of voices.

"Flag of truce!" I heard some one say; and then, immediately after, with a cry of surprise, "Silver himself!"

And, at that, up I jumped, and, rubbing my eyes, ran to a loophole in the wall.

Sure enough, there were two men just outside the stockade, one of them waving a white cloth; the other, no less a person than Silver himself, standing placidly by.

It was still quite early, and the coldest morning that I think I ever was abroad in; a chill that pierced into the marrow. The sky was bright and cloudless overhead, and the tops of the trees shone rosily in the sun. But where Silver stood with his lieutenant all was still in shadow, and they waded knee deep in a low white vapor, that had crawled during the night out of the morass. The chill and the vapor taken together told a poor tale of the island. It was plainly a damp, feverish, unhealthy spot.

"Keep indoors, men," said the captain. "Ten to one this is a trick."

Then he hailed the buccaneer.

"Who goes? Stand, or we fire."

"Flag of truce," cried Silver.

The captain was in the porch, keeping himself carefully out of the way of a treacherous shot should any be intended. He turned and spoke to us:

"Doctor's watch on the lookout. Dr. Livesey, take the north side, if you please; Jim, the east; Gray, west. The watch below, all hands to load muskets. Lively, men, and careful."

And then he turned again to the mutineers.

"And what do you want with your flag of truce?" he cried.

This time it was the other man who replied.

"Cap'n Silver, sir, to come on board and make terms," he shouted.

"Cap'n Silver! Don't know him. Who's he?" cried the captain. And we could hear him adding to himself: "Cap'n, is it? My heart, and here's promotion!"

Long John answered for himself.

"Me, sir. These poor lads have chosen me cap'n, after your desertion, sir"—laying a particular emphasis upon the word "desertion." "We're willing to submit, if we can come to terms, and no bones about it. All I ask is your word, Cap'n Smollett, to let me safe and sound out of this here stockade, and one minute to get out o' shot before a gun is fired."

"My man," said Captain Smollett,

"I have not the slightest desire to talk to you. If you wish to talk to me, you can come, that's all. If there's any treachery it'll be on your side, and the Lord help you."

"That's enough, cap'n," shouted Long John cheerily. "A word from you's enough. I know a gentleman and you may lay to that."

We could see the man who carried the flag of truce attempting to hold Silver back. Nor was that wonderful, seeing how cavalier had been the captain's answer. But Silver laughed at him aloud and slapped him on the back, as if the idea of alarm had been absurd. Then he advanced to the stockade, threw over his crutch, got a leg up, and with great vigor and skill succeeded in surmounting the fence and dropping safely to the other side.

I will confess that I was far too much taken up with what was going on to be of the slightest use as sentry; indeed, I had already deserted my eastern loop-hole and crept up behind the captain, who had now seated himself on the threshold, with his elbows on his knees, his head in his hands, and his eyes fixed on the water, as it bubbled out of the old iron kettle in the sand. He was whistling to himself, "Come, Lasses and Lads."

Silver had terrible hard work getting up the knoll. What with the steepness of the incline, the thick tree stumps and the soft sand, he and his crutch were as helpless as a ship in stays. But he stuck to it like a man in silence, and at last arrived before the captain, whom he saluted in the handsomest style. He was tricked out in his best; an immense blue coat, thick with brass buttons, hung as low as to his knees, and a fine laced hat was set on the back of his head.

"Here you are, my man," said the captain, raising his head. "You had better sit down."

"You ain't a-going to let me inside, cap'n?" complained Long John. "It's a main cold morning to be sure, sir, to sit outside upon the sand."

"Why, Silver," said the captain, "if you had pleased to be an honest man, you might have been sitting in your galley. It's your own doing. You're either my ship's cook—and then you were treated handsome—or Cap'n Silver, a common mutineer and pirate, and then you can go hang!"

"Well, well, cap'n," returned the sea cook, sitting down as he was bidden on the sand, "you'll have to give me a hand up again, that's all. A sweet pretty place you have of it here. Ah, there's Jim! The top of the morning to you, Jim. Doctor, here's my service. Why, there you all are together like a happy family, in a manner of speaking."

"If you have anything to say, my man, better say it," said the captain.

"Right you were, Cap'n Smollett," replied Silver. "Dooty is dooty, to be sure. Well, now, you look here, that was a good lay of yours last night. I don't deny it was a good lay. Some of you pretty handy with a handspike-end. And I'll not deny neither but what some of my people was shook—maybe all was shook; maybe I was shook myself; maybe that's why I'm here for terms. But you mark me, cap'n, it won't do twice, by thunder! We'll have to do sentry-go, and ease off a point or so on the rum. Maybe you think we were all a sheet in the wind's eye. But I'll tell you I was sober; I was on'y dog tired; and if I'd awoke a second sooner I'd a' caught you at the act, I would. He wasn't dead when I got round to him, not he."

"Well?" says Captain Smollett, as cool as can be.

All that Silver said was a riddle to him, but you would never have guessed it from his tone. As for me, I began to have an inkling. Ben Gunn's last words came back to my mind. I began to suppose that he had paid the buccaneers a visit while they all lay drunk together round their fire, and I reckoned up with glee that we had only fourteen enemies to deal with.

"Well, here it is," said Silver. "We want that treasure, and we'll have it—that's our point! You would just as soon save your lives, I reckon; and that's yours. You have a chart, haven't you?"

"That's as may be," replied the captain.

"Oh, well, you have, I know that," returned Long John. "You needn't be so husky with a man; there ain't a particle of service in that, and you may lay to it. What I mean is, we want your chart. Now, I never meant you no harm."

"That won't do with me, my man," interrupted the captain. "We know exactly what you meant to do, and we don't care; for now, you see, you can't do it."

And the captain looked at him calmly, and proceeded to fill a pipe.

"If Abe Gray—" Silver broke out.

"Avast there!" cried Mr. Smollett. "Gray told me nothing, and I asked him nothing; and what's more I would see you and him and this whole island blown clean out of the water into blazes first. So there's my mind for you, my man, on that."

This little whiff of temper seemed to cool Silver down. He had been growing nettled before, but now he pulled himself together.

"Like enough," said he. "I would set no limits to what gentlemen might consider shipshape, or might not, as the case were. And, seein' as how you are about to take a pipe, cap'n, I'll make so free as do likewise."

And he filled a pipe and lighted it; and the two men sat silently smoking for quite a while, now looking each other in the face, now stopping their tobacco, now leaning forward to spit. It was as good as the play to see them.

"Now," resumed Silver, "here it is. You give us the chart to get the treasure by, and drop shooting poor seamen, and stoving of their heads in while asleep. You do that, and we'll offer you a choice. Either you come aboard along of us, once the treasure shipped, and then I'll give you my affydvay, upon my word of honor, to clap you somewhere safe ashore. Or, if that ain't to your fancy, some of my hands being rough, and having old scores, on account of hazing, then you can stay here, you can. We'll divide stores with you, man for man; and I'll give my affydvay, as before, to speak the first ship I sight, and send 'em here to pick you up. Now you'll own that's talking. Handsomer you couldn't look to get, not you. And I hope"—raising his voice—"that all hands in this here blockhouse will overhaul my words, for what is spoke to one is spoke to all."

Captain Smollett rose from his seat, and knocked out the ashes of his pipe in the palm of his left hand.

"Is that all?" he asked.

"Every last word, by thunder!" answered John. "Refuse that, and you've seen the last of me but musket-balls."

"Very good," said the captain. "Now you'll hear me. If you'll come up one by one, unarmed, I'll engage to clap you all in irons, and take you home to a fair trial

in England. If you won't, my name is Alexander Smollett, I've flown my sovereign colors, and I'll see you all to Davy Jones. You can't find the treasure. You can't sail the ship—there's not a man among you fit to sail the ship. You can't fight us—Gray, there, got away from five of you. Your ship's in irons, Master Silver; you're on a lee shore, and so you'll find. I stand here and tell you so; and they're the last good words you'll get from me; for, in the name of heaven, I'll put a bullet in your back when next I meet you. Tramp, my lad. Bundle out of this, please, hand over hand, and double quick."

Silver's face was a picture; his eyes started in his head with wrath. He shook the fire out of his pipe.

"Give me a hand-up!" he cried.

"Not I," returned the captain.

"Who'll give me a hand-up?" he roared.

Not a man among us moved. Growling the foulest imprecations, he crawled along the sand till he got hold of the porch and could hoist himself again upon his crutch. Then he spat into the spring.

"There!" he cried, "that's what I think of ye. Before an hour's out, I'll stove in your old blockhouse like a rum puncheon. Laugh, by thunder, laugh! Before an hour's out, ye'll laugh upon the other side. Them that die'll be the lucky ones."

And with a dreadful oath he stumbled off, plowed down the sand, was helped across the stockade, after four or five failures, by the man with the flag of truce, and disappeared in an instant afterward among the trees.

As soon as Silver disappeared, the captain, who had been closely watching him, turned toward the interior of the house, and found not a man of us at his post but Gray. It was the first time we had ever seen him angry.

"Quarters!" he roared. And then, as we all slunk back to our places, "Gray," he said, "I'll put your name in the log; you've stood by your duty like a seaman. Mr. Trelawney, I'm surprised at you, sir. Doctor, I thought you had worn the king's coat! If that was how you served at Fontenoy, sir, you'd have been better in your berth."

The doctor's watch were all back in their loopholes, the rest were busy load-

ing the spare muskets, and every one with a red face, you may be certain, and a flea in his ear, as the saying is.

The captain looked on for awhile in silence. Then he spoke.

"My lads," said he, "I've given Silver a broadside. I pitched it in red-hot on purpose; and before the hour's out, as he said, we shall be boarded. We're outnumbered, I needn't tell you that, but we fight in shelter; and, a minute ago, I should have said we fought with discipline. I've no manner of doubt that we can drub them, if you choose."

Then he went the rounds, and saw, as he said, that all was clear.

On the two short sides of the house, east and west, there were only two loopholes; on the south side where the porch was, two again; and on the north side, five. There was a round score of muskets for the seven of us; the firewood had been built into four piles—tables, you might say—one about the middle of each side, and on each of these tables some ammunition and four loaded muskets were laid ready to the hand of the defenders. In the middle, the cutlasses lay ranged.

"Toss out the fire," said the captain; "the chill is past, and we mustn't have smoke in our eyes."

The iron fire basket was carried bodily out by Mr. Trelawney, and the embers smothered among sand.

"Hawkins hasn't had his breakfast. Hawkins, help yourself, and back to your post to eat it," continued Captain Smollett. "Lively, now, my lad; you'll want it before you've done. Hunter, serve out a round of brandy to all hands."

And while this was going on, the captain completed, in his own mind, the plan of the defense.

"Doctor, you will take the door," he resumed.

"See, and don't expose yourself; keep within, and fire through the porch. Hunter, take the east side, there. Joyce, you stand by the west, my man. Mr. Trelawney, you are the best shot—you and Gray will take this long north side, with the five loopholes; it's there the danger is. If they can get up to it, and fire in upon us through our own ports, things would begin to look dirty. Hawkins, neither you nor I are much account at the shooting; we'll stand by to load and bear a hand."

As the captain had said, the chill was past. As soon as the sun had climbed above our girdle of trees, it fell with all its force upon the clearing, and drank up the vapors at a draught. Soon the sand was baking, and the resin melting in the logs of the blockhouse. Jackets and coats were flung aside; shirts thrown open at the neck, and rolled up to the shoulders; and we stood there, each at his post, in a fever of heat and anxiety.

An hour passed away.

"Hang them!" said the captain. "This is as dull as the doldrums. Gray, whistle for a wind."

And just at that moment came the first news of the attack.

"If you please, sir," said Joyce, "if I see any one am I to fire?"

"I told you so!" cried the captain.

"Thank you, sir," returned Joyce, with the same quiet civility.

Nothing followed for a time; but the remark had set us all on the alert, straining ears and eyes—the musketeers with their pieces balanced in their hands, the captain out in the middle of the blockhouse, with his mouth very tight and a frown on his face.

So some seconds passed, till suddenly Joyce whipped up his musket and fired. The report had scarcely died away ere it was repeated and repeated from without in a scattering volley, shot behind shot, like a string of geese, from every side of the enclosure. Several bullets struck the log-house, but not one entered; and, as the smoke cleared away and vanished, the stockade and the woods around it looked as quiet and empty as before. Not a bough waved, not the gleam of a musket-barrel betrayed the presence of our foes.

"Did you hit your man?" asked the captain.

"No, sir," replied Joyce. "I believe not, sir."

"Next best thing to tell the truth," muttered Captain Smollett. "Load his gun, Hawkins. How many should you say there were on your side, doctor?"

"I know precisely," said Dr. Livesey. "Three shots were fired on this side. I saw the three flashes—two close together—one farther to the west."

"Three!" repeated the captain. "And how many on yours, Mr. Trelawney?"

But this was not so easily answered. There had come many from the north—seven,

by the squire's computation; eight or nine, according to Gray. From the east and west only a single shot had been fired. It was plain, therefore, that the attack would be developed from the north, and that on the other three sides we were only to be annoyed by a show of hostilities. But Captain Smollett made no change in his arrangements. If the mutineers succeeded in crossing the stockade, he argued, they would take possession of any unprotected loophole, and shoot us down like rats in our own stronghold.

Nor had we much time left to us for thought. Suddenly, with a loud huzza, a little cloud of pirates leaped from the woods on the north side, and ran straight on the stockade. At the same moment, the fire was once more opened from the woods, and a rifle-ball sang through the doorway, and knocked the doctor's musket into bits.

The boarders swarmed over the fence like monkeys. Squire and Gray fired again and yet again; three men fell, one forward into the enclosure, two back on the outside. But of these, one was evidently more frightened than hurt, for he was on his feet again in a crack, and instantly disappeared among the trees.

Two had bit the dust, one had fled, four had made good their footing inside our defenses; while from the shelter of the woods seven or eight men, each evidently supplied with several muskets, kept up a hot though useless fire on the log-house.

The four who had boarded made straight before them for the building, shouting as they ran, and the men among the trees shouted back to encourage them. Several shots were fired; but, such was the hurry of the marksmen, that not one appears to have taken effect. In a moment the four pirates had swarmed up the mound and were upon us.

The head of Job Anderson, the boatswain, appeared at the middle loophole. "At 'em, all hands—all hands!" he roared, in a voice of thunder.

At the same moment another pirate grasped Hunter's musket by the muzzle, wrenched it from his hands, plucked it through the loophole, and, with one stunning blow, laid the poor fellow senseless on the floor. Meanwhile, a third, running unharmed all round the house, appeared suddenly in the doorway and fell with his cutlass on the doctor.

Our position was utterly reversed. A moment since we were firing under cover at an exposed enemy; now it was we who lay uncovered and could not return a blow.

The log-house was full of smoke, to which we owed our comparative safety. Cries and confusion, the flashes and reports of pistol shots and one loud groan rang in my ears.

"Out, lads, out, and fight 'em in the open! Cutlasses!" cried the captain.

I snatched a cutlass from the pile and some one, at the same time snatching another, gave me a cut across the knuckles which I hardly felt. I dashed out of the door into the clear sunlight. Some one was close behind, I knew not whom. Right in front the doctor was pursuing his assailant down the hill, and just as my eyes fell upon him, beat down his guard and sent him sprawling on his back, with a great slash across the face.

"Round the house, lads! round the house!" cried the captain; and even in the hurly-burly I perceived a change in his voice.

Mechanically I obeyed, turned eastward, and with my cutlass raised ran round the corner of the house. Next moment I was face to face with Anderson. He roared aloud, and his hanger went up above his head, flashing in the sunlight. I had not time to be afraid, but as the blow still hung impending leaped in a trice upon one side, and missing my foot in the soft sand, rolled headlong down the slope.

When I had first sallied from the door the other mutineers had been already swarming up the palisade to make an end of us. One man in a red nightcap, with his cutlass in his mouth, had even got upon the top and thrown a leg across. Well, so short had been the interval, that when I found my feet again all was in the same posture, the fellow with the red nightcap still halfway over, another still just showing his head above the top of the stockade. And yet, in this breath of time, the fight was over, and the victory was ours.

Gray, following close behind me, had cut down the big boatswain ere he had time to recover from his lost blow. Another had been shot at a loophole in the very act of firing into the house, and now lay in agony, the pistol still smoking in his hand. A third, as I had seen, the

doctor had disposed of at a blow. Of the four who had scaled the palisade, one only remained unaccounted for, and he, having left his cutlass on the field, was now clambering out again with the fear of death upon him.

"Fire—fire from the house!" cried the doctor. "And you, lads, back into cover."

But his words were unheeded, no shot was fired, and the last boarder made good his escape, and disappeared with the rest into the wood. In three seconds nothing remained of the attacking party but the five who had fallen, four on the inside, and one on the outside of the palisade.

The doctor and Gray and I ran full speed for shelter. The survivors would soon be back where they had left their muskets, and at any moment the fire might recommence.

The house was by this time somewhat cleared of smoke, and we saw at a glance the price we had paid for victory. Hunter lay beside his loophole, stunned; Joyce, by his, shot through the head, never to move again; while right in the center, the squire was supporting the captain, one as pale as the other.

"The captain's wounded," said Mr. Trelawney.

"Have they run?" asked Mr. Smollett.

"All that could, you may be bound," returned the doctor; "but there's five of them will never run again."

"Five!" cried the captain. "Come, that's better. Five against three leaves us four to nine. That's better odds than we had at starting. We were seven to nineteen then, or thought we were, and that's as bad to bear."

There was no return of the mutineers—not so much as another shot out of the woods. They had "got their rations for that day," as the captain put it, and we had the place to ourselves and a quiet time to overhaul the wounded and get dinner. Squire and I cooked outside in spite of the danger, and even outside we could hardly tell what we were at, for horror of the loud groans that reached us from the doctor's patients.

Out of the eight men who had fallen in the action, only three still breathed—that one of the pirates who had been shot at the loophole, Hunter, and Captain Smollett; and of these the first two were as good as dead; the mutineer, indeed, died under the doctor's knife, and Hunter, do what we could, never recovered conscious-

ness in this world. He lingered all day, breathing loudly like the old buccaneer at home in his apoplectic fit; but the bones of his chest had been crushed by the blow and his skull fractured in falling, and some time in the following night, without sign or sound, he went to his Maker.

As for the captain, his wounds were grievous indeed, but not dangerous. No organ was fatally injured. Anderson's ball—for it was Job that shot him first—had broken his shoulder-blade and touched the lung, not badly; the second had only torn and displaced some muscles in the calf. He was sure to recover, the doctor said, but, in the meantime and for weeks to come, he must not walk nor move his arm, nor so much as speak when he could help it.

My own accidental cut across the knuckles was a flea-bite. Dr. Livesey patched it up with plaster and pulled my ears for me into the bargain.

After dinner the squire and the doctor sat by the captain's side awhile in consultation; and when they had talked to their hearts' content, it being then a little past noon, the doctor took up his hat and pistols, girt on a cutlass, put the chart in his pocket, and with a musket over his shoulder, crossed the palisade on the north side, and set off briskly through the trees.

Gray and I were sitting together at the far end of the blockhouse, to be out of earshot of our officers consulting; and Gray took his pipe out of his mouth and fairly forgot to put it back again, so thunderstruck he was at this occurrence.

"Why, in the name of Davy Jones," said he, "is Dr. Livesey mad?"

"Why, no," says I. "He's about the last of this crew for that, I take it."

"Well, shipmate," said Gray, "mad he may not be; but if *he's* not, you mark my words, I am."

"I take it," replied I, "the doctor has his idea; and if I am right, he's going now to see Ben Gunn."

I was right, as appeared later; but, in the meantime, the house being stifling hot, and the little patch of sand inside the palisade ablaze with midday sun, I began to get another thought into my head, which was not by any means so right.

But we must leave the fascinating words of the book and condense the tale.

While nobody was watching, Jim took a brace of pistols, filled his pockets with biscuits, and made a bolt over the stockade and into the thickets in the direction of the sea, where Ben Gunn said he had left his boat.

As he crept cautiously along the shore, he spied the Hispaniola still at anchor. As it was growing dark, he hastened along, eager to locate Gunn's boat. Finally he found it in a hollow, hidden by the banks and thicket. It was a rude, home-made little coracle, and Jim took a great fancy to it. Impulsively he shouldered it, and groped his way through the swamp under cover of darkness, waded out into the water, and set the coracle on the surface. He paddled toward the Hispaniola, finding her with difficulty in the darkness. When he neared it, he grasped the hawser with one hand, opened his knife with his teeth, and cut one strand after another.

The schooner began to turn upon her heel, spinning slowly across the current. A light rope was trailing overboard across the stern bulwarks. Jim grasped the rope and pulled himself up the rope into the big ship, and dropped upon the deck.

One glance into the cabin showed two drunken figures locked together in a deadly wrestle, each with a hand upon the other's throat. Suddenly the schooner lurched, and the fighters, interrupted in their quarrel, realized their danger. For a time Jim looked around the ship, then he returned to the little coracle.

In the morning he paddled the coracle near the ship and climbed aboard. In an encounter with Hands, the last of the mutineers on the ship, he was victorious. He hauled down the black flag of piracy and brought the ship to the beach on the other side of the island. Elated at his success, he came ashore and started toward the stockade to boast of his achievements. There he was surprised to find the pirates in possession of the fort.

Silver caught the lad but saved him from the knives of the other angry rogues. The one-legged villain's thought was that if he spared Jim's life, the day might come when Jim would save him from hanging.

Thinking that Silver was deserting them, the other buccaneers held a council and handed Silver the black spot. But Silver pacified them and showed them that he possessed the real chart.

Suddenly a voice sounded from the margin of the wood. "Blockhouse

ahoy!" it cried. It was the doctor, who stopped in surprise as he entered and saw Jim. Silver announced that Jim must stay with the pirates.

The doctor went away again, and next morning Jim, under order from the buccaneers, followed them on their search for the treasure. After searching in vain for a long time, suddenly they came upon a ghastly human skeleton.

"Shiver my timbers! that's a p'inter," said Silver. "Flint killed his six men, and laid this one down by compass. That's his joke. Take a bearing along the line of them bones."

"Fifteen men on the Dead Man's Chest," a high, trembling voice sounded in the air. The buccaneers in alarm stood rooted to the ground.

"Sounds like Flint, or, by the powers, Ben Gunn!" roared Silver.

It was indeed Ben Gunn, but in the flesh, not in the spirit, as the pirates feared. The old seaman had hidden himself and had played this trick upon his former comrades.

But their courage gradually returned as Silver urged them on. The thought of the money swallowed up their previous terrors, and they continued the hunt. Silver halted in front of a deep excavation, and saw on a board in front of the pit the name of Flint's ship—the Walrus.

Instantly the pirates realized that the treasure had been taken, but they dug frantically in the pit, hoping to find some stray coins. Suddenly musket-shots flashed out of the thicket. Those of the mutineers who were not killed threw down their arms and fled. The doctor and Ben Gunn emerged. The doctor recounted the story that Gunn had found the treasure and had hidden it. Livesey had given Silver the useless chart and the provisions, and had lived with Gunn, sharing his storehouse of food. Gunn led the men to his cave and there on the floor lay great heaps of gold.

For three days they worked to get the coins aboard the ship. Then they sailed for home, reaching Bristol with only five of the original party. "Drink and the devil had done for the rest." Silver was taken along because he had saved Jim's life and because in the last fight he had fought against the mutineers. But he left the ship at a Spanish-American port and was never heard of again.

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 4767.

FOUR BIRDS THAT CANNOT FLY



The Blue-necked Cassowary.



The Emu.



The Somali Ostrich.



The Khea.



Darwin's Rhea.



The Kiwi.



A baby Rhea.

BIRDS THAT CANNOT FLY

SINDBAD THE SAILOR, in the second of his seven voyages, was left on an uninhabited island, and seemed destined to die a miserable death, until a bird whose greatness darkened the sky swooped down. The intrepid Sindbad tied himself by the linen of his turban to a leg of the bird, which carried him to the famous Valley of Diamonds.

Now we have not actually a bird which could fly away with a man, but we have birds which can run away with two. And these strange monster birds are equal in bulk to three men. Even so, they do not darken the sky as Sindbad's bird did, for a sufficient reason; these giant birds can no longer fly. In the seas are giant mammals which cannot walk on land; on the earth are giant birds which cannot rise into the air.

It is well for us that these feathered monsters do not fly, for they might have conquered the earth. Try to image a flying ostrich! There is the fearful and awe-inspiring blow from a whale's tail, or from a giraffe's hind leg, or from the paw of a lion, or from the tusk of a swordfish, or from a big hyena's jaws. The kick of an ostrich is also effective: it can break a man's leg or even kill him. The members of the ostrich-like tribes of birds must



have resorted to kicking because, unlike winged birds, they must from time

to time stay and fight out a battle for life on the ground. How they lost the use of their wings we can only guess.

In Africa the ostriches picked up a living where vegetation was sparse. They were safe from attack, and, seldom needing to rise into the air to secure safety, they confined themselves to running. The time came when mere weight would have made it impossible for wings to lift them on high.

But for the intervention of man they might have gone increasing in bulk still more. A fine ostrich of to-day measures up to eight feet to the crown of his head, and nearly five feet to the top of the back.

That such dimensions do not represent the limit of possibilities we know from the giant moa of New Zealand. This bird was at least twelve feet high, set on limbs whose great bones exceeded in strength and bulk those of a modern horse.

True ostriches are confined to Africa. South America has rheas; Australasia has cassowaries and emus; New Zealand still has the little cousin of the moa in the kiwi. Once the range of the ostrich tribe was much more widespread in warm lands, and Asia, which

now has none, was the cradle of very great species.

THE LIVING PERISCOPE THAT CAN RUN LIKE THE WIND

Seeing that he is a child of almost desert conditions, the Ostrich represents a triumph over adversity. He is a bird of many animal friendships. When his chicks are hatched he moves off into the company of zebras and antelopes. He towers above them and acts, we may guess, as a sort of animate periscope for the herd to spy out danger from afar.

Should the menace approach nearer, he can run like the wind. Extraordinary estimates of the ostrich's speed are set down, even as much as sixty miles an hour, for the first great burst. How is it, then, that horsemen are able to run the ostrich down? In broken country it cannot be done fairly; the bird can race right away from the fleetest horse under such conditions. But several horsemen acting in concert can hem in an ostrich flock and effect a capture by advancing from several directions.

Yet, for all his speed and powers of endurance, the ostrich likes to keep in a certain neighborhood, and he runs in a great circle, bringing himself back to the point from which he set out. Knowledge of that fact enables the hunter to get within striking distance by covering only a small part of the distance the bird has traveled.

THE FABLE OF THE OSTRICH BURYING ITS HEAD IN THE SAND

There is no truth in the legend that ostriches bury their heads in the sand and think themselves safe from capture. The only suggestion for the notion is that the young, and sometimes a nesting parent, stretch their necks flat on the sand as they cower down, seeking to avoid recognition. And indeed there is no reason why they should bury their heads in the sand. Their great length of neck is given them in order that they may see a great distance. Of course, with so huge a frame crowned by so tiny a head, they have not much mental power, but they have instinct and courage.

The male has perhaps half a dozen companions, and these all lay their eggs in one nest, which he sits on throughout the night when danger from jackals and other wandering beasts is to be feared. Usually one of the females sits upon them during the day, but often the eggs are left

during daylight to the care of the sun, but not before they have been liberally covered with sand to prevent them from being scorched and addled by too great a heat. Very often more eggs are laid than one bird can cover, and the parent birds are said to break them for food for the young chicks that do hatch. An egg weighs about as much as two dozen hen's eggs.

In South Africa, Algeria, Argentina, Southern Europe and the United States ostriches are now farmed like poultry, but it is farming on the heroic scale, for an ostrich farm must have acres of land for each bird. Their value lies in their beautiful feathers. These are clipped from the wings and tail once every seven to nine months, just before the bird is ready to molt.

The ostrich is confined in a V-shaped wooden stall; and his head is covered with a hood; then he is passive and harmless. The feathers are cut through the quill without pain. Rough or cruel usage would affect the health of the ostrich and make it unprofitable to its owner, so that the greatest care is exercised in the treatment, and ostrich feathers may be worn without a twinge of conscience. The best on the market come from the domesticated birds, from Africa, from America, from Australia, even from sunny Southern Europe.

HOW THE BIG STONES HELP THE OSTRICH TO DIGEST ITS DINNER

Under wild conditions the ostrich eats anything that can be eaten; snakes, lizards, small mammals and birds, insects and great quantities of vegetation. Also in order to aid digestion, it swallows pebbles and even stones as large as hen's eggs. Ostriches, of which there are several local races in Africa, have but two toes, armed with short, blunt nails. The rest of the family, which have hair-like feathers, useless to commerce, have three toes, and these bear great horny claws.

The Rhea is known in the New World as the South American Ostrich. It numbers three species, and though it takes with delight to water, and swims well, it is entirely a creature of the grassy plains. For long after man appeared in America it had little to fear. Its speed was too great for him, its strength and fierceness made it a terrific foe at close quarters. But two centuries ago the native Indians began to ride horses, and so could attack the rhea by new methods, with the result

that rheas now seem born with a fear of horsemen, but are quite at ease in the presence of men on foot, except where the shot-gun has been introduced. Hudson found that young rheas followed him about as if he were their parent, and when he made a cry imitating their familiar warning of danger, they would scutter up to him for protection.

**THE BIRD THAT ATTACKS A HORSEMAN
WITH THE FEROCITY OF A LION**

But horsemen they cannot endure, except in areas where they are protected, and instances are on record where mounted men have been attacked, a great rhea leaping with lion-like ferocity bodily on horse and rider. The nesting habits are similar to those of the ostrich. Though it has no plumes, its feathers are valuable and the bird seems likely to disappear at no distant date. The skins are also made up into rugs which find a ready market.

The Australian regions are rich in cassowaries and emus. Of the cassowaries nine species are known, all readily distinguished from the emu by the horny helmet on the head, covered with a thin membrane.

Animal life in Australasia differs in some respect from other animal life, and in the Cassowaries we find ostrich-like birds which do not keep to the open. They are forest-dwellers, powerful and deadly with their great clawed feet when brought to bay, but shy and only too anxious to preserve the secret of their existence in the forest and undergrowth in which their native land abounds.

A fine cassowary measures five feet to the top of the head, but the emu is a still grander creature, ranking second in size only to the ostrich. It is curious that the emu hen, like the kiwi hen, is larger than her mate, whereas the males are the bigger in the other groups of the family. Both sexes are notable as warriors, but the female emu is famous for the strength and lightning-like rapidity with which she delivers her blows.

**THE EMU OF AUSTRALIA, WHICH THRIVES
ON MAN'S MISFORTUNE**

In common with all other wild life in Australia, Emus have suffered severely from the arrival of man, and in many districts have been declared practically extinct. But surprising news comes from Queensland. One of the plagues introduced into the island continent is the

prickly pear, which advances like a fire over the ground, and the emu is the thing which has profited by this vegetable scourge. A British Museum expedition which was out in search of specimens in Queensland in 1923 found that wherever the prickly pear is, the emu thrives amazingly. Wherever the pear was thickest the birds were most numerous and in finest condition. Ruin to the human colonist is food and fortune to the emu.

New Zealand has lost her superb great moas, but she preserves still the extraordinary Kiwi. Here is a bird which has retained four toes, but has lost so much of its wings that the vestiges remaining cannot be seen, but lie hidden beneath the heavy, hair-like feathers of the back.

In size the kiwi is no more than an average hen of the poultry run, yet it lays an enormous egg, upward of five inches long and three inches across. This reminds us of the extinct *Æpyornis* of Madagascar, whose eggs are said to have measured thirty-six inches by thirty. A dim-sighted creature of the night, this bird relies for its living on a long, snipe-like beak which is unique in having the nostrils at the tip like those of a crocodile, not at the base as in the case of all other birds.

**THE TERRIBLE DEFENSIVE DEVICE
OF THE KIWI OF NEW ZEALAND**

Thick-legged and strong like the rest of its family, the little kiwi is skilled and valiant in combat. A friend of the writer, hunting in New Zealand jungle conditions with two bold dogs, unexpectedly put up a kiwi. Instantly it attacked one of the hounds, and a blow from its powerful clawed foot tore a fatal wound in the flesh of the astonished victim. To such perfection of defense has experience of man and his tamed animals brought the kiwi.

These flightless birds have brought us down to earth from the skies and seas and dizzy heights of the mountains. We have run quickly over the whole range of bird creation; have listened in fancy to their singing; seen them at their nesting and nursing; noted their battles, their loves, their terrors; and flown with them round the earth and back a hundred times. We leave the bird kingdom to turn to the reptiles, after which we shall go to speak of the queer amphibians, the fishes, the wonderful insects and many other interesting members of the animal world.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 4759.

PETER MAKES THE ACQUAINTANCE OF THE DARLINGS



The Darling family. Mr. and Mrs. Darling are going out to a party, and the children and Nana are all interested in seeing them get dressed. It was on this particular night that Peter Pan came back to find his shadow.



Peter and Nana making one another's acquaintance on the first occasion when Peter visited the Darling house.



Wendy and Peter just beginning to make friends as Peter tells her all about the wonderful Never-Land.



Peter's desperate encounter with Captain Hook of the Jolly Roger.

THE STORY OF PETER PAN

THERE was once upon a time a little girl named Wendy Moira Angela Darling. She lived in a house with her brothers, John Napoleon Darling and Michael Nicholas Darling. This house was an ordinary house of brick and slates, but one thing about it was quite extraordinary. It contained a Newfoundland dog whose name was Nana, and this dog acted as nurse to the three children.

Nana was so clever that he never allowed the children to put on a flannel nightdress before it was aired at the fire; and he knew how to turn on the hot water when it was bath-time; and however the children might cry that they would *not* be bathed, or that they would *not* go to bed, Nana always insisted that they should.

Now, Mrs. Darling loved Nana, and she had a particular reason for keeping this brave and powerful dog as the children's nurse. One night on visiting the nursery she had seen a strange flitting Shape moving quickly to and fro in the dim glow of the night light. At sight of her this Shape rushed to the window. Mrs. Darling darted toward it, and as it sprang into the night she pulled down the window with a bang. The Shape escaped; but something fell on the floor at Mrs. Darling's feet. It

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was the shadow of this strange, flitting creature. Mrs. Darling put the shadow in a drawer; but she felt very nervous for the safety of the children. She feared that the Shape might come back and do them some dreadful harm. The only comfort she had was the presence of Nana in the nursery. The big dog, she thought, would protect her children from all danger. But one night Mr. Darling was rather cross, and he said it was ridiculous to have a dog for a nurse; and he got so cross at last that he said Nana should sleep in a kennel in the yard. Mrs. Darling pleaded, the children cried, Nana barked. Mr. Darling, however, was extremely cross, and Nana was led away to the yard moaning and growling.

That night the window was thrust open, and into the room glided and skipped the mysterious Shape.

"Where is my shadow?" it cried; while Nana barked furiously outside. "I can't be happy without my shadow. Tinker Bell, Tinker Bell, where is my dear little shadow?"

Instantly a spot of light flicked into the room, and sprang round the walls, and over the ceiling, and down the beds, and across the carpet, making a tinkling sound wherever it flitted and

whenever it settled for a moment. This was the fairy Tinker Bell, a little female fairy. She told the Shape where the shadow lay, and soon the drawer was open, the shadow pulled forth, and the Shape skipped round the room with delight—singing, dancing, laughing in its joy, while Tinker Bell flashed round the room like a luminous butterfly. But, alas! when the Shape tried to make the shadow stick on, it refused, and so all the delight went and the Shape burst into passionate tears.

Just at this moment Wendy awoke. She was not frightened, and asked the little Shape why it was crying. Then she asked it its name, and the Shape told her that it was Peter Pan. Wendy got needle and thread and stitched the shadow on to Peter Pan, and Peter Pan danced with joy, for wherever he went the shadow followed him on the floor.

Then Peter Pan told Wendy his story. He said that he lived in a place called Never-Never-Land

with a lot of little boys who had all been dropped out of their perambulators by careless nurses; and that they lived with fairies and would never grow up, but for always and always would remain happy boys in this enchanting Never-Never-Land.

He told her that when the first baby laughed, the laughter broke into little pieces, and each little piece became a fairy and went dancing about the world. But whenever a child says that it does not believe in fairies, then one of the fairies dies. Peter Pan said it was dreadful for a child to say it did not believe

in fairies. There was only one other thing that made them sad, he said, and this was the want of a mother; all the boys in Never-Never-Land wanted to have a mother very much indeed. Wendy asked if there was not a little girl among them who could pretend to be their mother; but Peter Pan shook his head and answered that *girls* never dropped out of their perambulators: they were far too clever. This explanation pleased Wendy, and she at once loved Peter Pan.

"Oh, Wendy," cried Peter, "come and live with us and be our mother!"

The two boys woke up, and Peter Pan said he would teach them all to fly if Wendy would only come and be their mother. All this time Tinker Bell was tinkling angrily and telling Peter Pan to come away at once. Tinker Bell loved Peter Pan and was jealous of Wendy.

When the children heard that they could learn to fly they were quite excited, and immediately began to spring in the air. But every

time, they fell and sprawled on the ground, or bumped flat on the beds.

"You must think beautiful thoughts," cried Peter Pan; and, so saying, soared up gracefully into the air and sailed noiselessly round the room.

Soon the children learned, and all began to fly around the room with cries of delight. Then the windows opened wide, and Peter Pan led the way into the night; and while Tinker Bell tinkled loudly and Nana barked warningly the children soared toward the stars. Second to the right, and straight on till morning, was the way to Never-Never-Land.



Miss Maude Adams as Peter Pan, a rôle which she played so beautifully that it has become a classic of the stage.

THE LOST BOYS IN NEVER-NEVER-LAND

THE boys in Never-Never-Land were growing anxious about Peter Pan, who was their captain. He seemed to be a long time away, and they were afraid of wolves and pirates. While they were wondering what had happened to Peter they saw what looked to them like a large white bird in the sky.

As they gazed at it Tinker Bell suddenly shone on the trees, and, tinkling very loudly, told them that Peter Pan wanted them to shoot this bird at once. So they ran and got bows and arrows and shot them into the air. Suddenly down

Now, while they were so happy in their house, through the wood came the terrible pirates. The captain of this frightful gang was named Captain James Hook, and a more horrible villain never froze the blood in a child's veins. All his crew feared him and cowered before him. His long black hair was enough to make you shiver; his yellow skin made you go white; his coal-black eyes struck daggers of fear into your hearts; but, far worse than all these, more awful even than his cackling laugh and his way of rolling his "r's" so that they sounded like pistols,



Peter and Wendy in the Never-Never-Land with all the boys that Wendy has come to mother.

fell—what do you think?—poor Wendy with an arrow in her breast. Jealous little Tinker Bell was responsible for this awful deed.

But she was not killed. Soon she revived, and then with her brothers round her, and Peter Pan holding her hand, she promised all the boys to be their mother. Then they set to and built Wendy a funny little house, with John Napoleon Darling's silk hat for its chimney-pot; and everybody was wonderfully happy, except Tinker Bell, who was more and more jealous of Wendy because Peter Pan loved her so much.

was his right hand. His right hand wasn't a hand at all: it was an iron hook. How he came to have that hook is part of the story.

Peter Pan had tripped the terrible pirate into the sea, and a crocodile, a tremendous c-r-r-r-r-roc-odile, had snapped off his hand and part of his wrist. Nor was this all. The crocodile enjoyed the captain's hand and wrist so much that it wanted more, and so it haunted the captain wherever he went, longing to eat another bit of him, and dreaming of the happy day when it would gobble him all up. The captain always knew when his

ferocious enemy was near, because on one occasion it had swallowed an alarm clock, and the ticking of this clock could be heard plainly through its skin. But the captain feared, because he knew the clock would one day run down and then the crocodile would be able to steal upon him unawares and finish him.

terested in something that Wendy was telling them underground.

Wendy, you must know, had become the mother of these boys, and they all did exactly what she told them, and all adored her, because it was so delightful to have a mother after having lived so long without one. After she had seen



The crocodile surprises Captain Hook and Smee as they dance in the wood.

You can imagine how this pirate hated Peter, the cause of all his troubles, and how he longed to slay him.

One day when some friendly Indians were guarding the boys, up came the pirates and made a great slaughter of the poor redskins. The boys did not hear the battle, for they were much in-

terested in something that Wendy was telling them underground. Wendy, you must know, had become the mother of these boys, and they all did exactly what she told them, and all adored her, because it was so delightful to have a mother after having lived so long without one. After she had seen

Well, on this night, Wendy was telling them a story about her own father and mother—a beautiful story which showed how that mother and father must be weeping for their lost children. As she was finishing, John Napoleon and Michael Nicholas sprang up in their beds, and said:

"Wendy, we must go back!"

"Yes," answered Wendy, "we must go back."

You can imagine how dreadfully sad all the motherless boys were when they heard that Wendy was going home. They

which led from their underground home to the forest and the night. Wendy was the last to go, and before she went she poured out some medicine for Peter and made him promise her that he would take it when he woke up in the morning.

In the meanwhile, however, the pirates had crept up on the Indians, and in the fight which followed, the redskins were defeated. The children listened anxiously to hear the tom-tom which would mean an Indian victory. The pirates, hearing Peter tell the children this, themselves beat the tom-tom to deceive their victims.



VICTORY! PETER HAS SAVED THE CHILDREN FROM THE PIRATES

cried so much that at last she told them they might come back with her and her brothers, and live in their house, and have Mr. and Mrs. Darling for their father and mother. All the boys accepted this offer with delight except Peter Pan. Peter Pan said he did not want to grow up. He did not want to live in a real house and go to school every day like other boys. He wanted to live always in Never-Never-Land with the fairies and birds and mermaids. In his heart he was terribly sad at losing Wendy, for whom his love was very great indeed; but he refused to go away and grow up like an ordinary boy.

So they all said good-bye to Peter Pan, and one by one went up the narrow tunnel

So, instead of kind Indians keeping guard, the pirates were there. The boys were seized one by one as they stepped on ground; a rough hand was clasped over their mouths to prevent them from crying out, and they were carried away prisoners to the pirate ship with Wendy.

The pirates made the boys double up with their knees close to their ears, and then tied them so that they could not fly away. Wendy they treated more gently.

But Captain Hook was not satisfied; it was Peter Pan he wanted most of all. Peter had thrown his arm to the crocodile and made his life miserable since; but it was Peter's cockiness which made Hook hate him and long to take him down.

HOW THE CHILDREN WENT HOME AGAIN

PETER PAN lay asleep in his bed. The rest of the boys were on board the pirate ship. Peter Pan was alone, and asleep. Captain Hook was creeping to the hole above. Now was his chance to slay his enemy.

Noiselessly the pirate chief crept down the hole. He arrived at the door and peeped over the top. Peter Pan was fast asleep. He tried to open the door but failed. Again and again his hook fumbled at the latch but failed. Peter Pan was safe. But no! The terrible captain espied the glass of medicine left by Wendy on a shelf; he reached toward it, and then, taking a bottle of poison from his pocket, poured the contents into the glass.

Peter Pan woke up. He remembered his promise to Wendy and went to drink the poison. At that moment Tinker Bell rushed in, crying: "Don't drink! Don't drink!"

But her warning was useless.

"I have promised Wendy," answered Peter, and walked toward the glass with his hand outstretched.

In vain did Tinker Bell warn him; but just as Peter was about to drink, the little Shining Light popped into the glass and drained all its deadly contents. Then it flickered and paled and drooped toward its bed, dying.

Peter knew there was only one way in which he could possibly save it.

"Do you believe in fairies? Oh, please say you believe in fairies!" he cried to all the world. And back from the world, which was so sorry for poor little Tinker Bell, came the answer: "We believe in fairies."

So Tinker Bell revived and was saved, and she told Peter Pan how the pirates had carried off the lost boys, with Wendy and her brothers, to their ship, and of the danger in which they stood.

Peter immediately started out. He arrived at the ship just as the captain was going to flog his prisoners before making them walk the plank. Peter Pan had an alarm clock in his pocket; he took it out, and at the first sound of that *tick-tick* the captain gave a great cry of horror, thinking that the cr-r-rocodile was near.

During the panic Peter stole on board ship and concealed himself in the cabin where the cat-o'-nine-tails was hidden.

The clock ran down. The captain grew

brave again. "Go and get the cat-o'-nine-tails!" he ordered.

One of the ruffians went to obey. As he entered the cabin a terrible shriek resounded all over the ship. Another pirate was ordered to go and see what had happened. He, too, uttered a ghastly shriek and did not come out.

The rest of the crew were now in a state of panic. They refused to enter the cabin; one threw himself into the sea.

Suddenly Peter Pan rushed out, sword in hand, and a terrible fight followed. Captain Hook was flung overboard, where the crocodile was waiting for him; and all the rest of the wicked pirates were killed.

Then Wendy and all the boys went home, and Peter and Tinker Bell went with them. When they reached the Darlings' house Peter made Tinker Bell close and bar the window so that Wendy could not fly in to her home and stay with her mother. He saw Mrs. Darling suddenly put her head down and cry. But Peter was stubborn; he would not give in. "I'm fond of her, too. We can't both have her, lady," he said. However, Wendy's mother could not seem to feel happy about it, and so at last, with a great effort, Peter unlocked the window and flew out.

When the children were in, John and Michael were a little bewildered, but gradually recalled the familiar room. They crept into their little beds, to pretend to their mother that they had never been away. Mrs. Darling came into the nursery, and seeing the children, thought she was dreaming. How often she had that dream! But when she had them in her arms she knew they were real. Then she called Mr. Darling to share her joy.

Mr. Darling, we must tell you, had been so repentant for his crossness that he had made Nana live indoors and dine at the table and occupy his own chair; while he himself slept in a kennel outside and ate all his meals out of a dog's trough. Mrs. Darling had always kept the window open, hoping that the children would return, and used to play and sing Home, Sweet Home, thinking that they might hear her and come back.

Peter Pan always refused to grow up, but he longed for little Wendy, so Mrs. Darling allowed her to visit him once a year and keep his house nice and tidy.

THE NEXT STORIES ARE ON PAGE 4749.



The wonderful effect that motion has on matter is illustrated in this picture. A candle, if pressed against a wooden board, would be pressed out of shape. But fired from a gun, so that it travels at great speed, the candle will go through the wood without itself being injured.

THE MOVEMENT OF THINGS

WE now come to another part of the story of the earth. We have a good idea of what the earth is, and we have studied some of the other worlds in space. We have learned also about the different elements that make up the earth and the sun and the stars, and the way in which those elements combine with each other. We have studied geology, astronomy, chemistry and geography to some extent.

There still remains to us a very important study, the name of which is physics, from the Greek word for "nature." By physics we now mean the study of motion, heat, light, sound and electricity; and here we go on to study motion.

When we look at the world around us, or at our own bodies, we find that two things catch our eye, matter and motion. We have shown what are the reasons for believing that all matter in all its forms can first be reduced to atoms, and that these atoms, though about ninety in number, are all different arrangements of the same thing which is the unit of electrical matter, the electron.

But motion is not a "thing" in the sense that matter is, yet it is real. If a boy notices the difference between holding a baseball in his hand and stopping the baseball when it is hit in his direction, he will know that motion is real. Or if we notice the difference

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between our feeling when we jump off a single step into the water and when we dive from a great height, we shall know that motion is real. We are beginning to believe that it is more real than matter,

and that matter is really a state of motion.

A state of motion in what? We think of a bird or a bullet flying through the air, or of a fish moving through the water. What is it the earth is moving in? Usually we say it is moving in space; and, in the broad meaning of the word, all things—the bird, the bullet, the fish, the earth, the sun and the stars—are alike moving in space. But can we think of space as empty? Our minds are so formed that we do not find it easy to think so. For example, as we shall presently have to show, the sun attracts, or pulls at, the earth and the other planets across space. How can it do so? Nobody can pull another person across a room if there is nothing but empty space between them. The two must be joined in some way, either to exert or to feel the pull. Yet we have just said that the sun acts on the earth at a distance; how can that be unless there is a something between them acting as a link?

It is possible to think of the earth as being whirled round the sun at the end of this link as we might whirl a stone tied to a string round our heads;

but what sort of string would it have to be to unite the earth and the sun, the one whirling round the other at a distance of over ninety million miles and at a speed unimaginable? Sir Oliver Lodge has calculated that a million million steel rods, each seventeen feet across, stretching from the earth to the sun, would only just stand the strain.

HOW LIGHT MAKES ITS JOURNEY FROM THE SUN TO EARTH

Again, our eyes tell us that light comes to us from the sun across space. We have learned that a light-ray takes about eight minutes to come from the sun to the earth. What becomes of the light during that eight minutes? It must be moving through something. We have learned also that it comes in waves, like ripples in water. What is it that is waving or rippling? Empty space cannot ripple.

The scientific men who first asked these questions found no better answers than to suppose that there was an actual something between the earth and the sun and the stars, something that could be set quivering like a jelly with ripples of light, and was yet strong enough to bear the awful pull between the heavenly bodies. They call it the Ether, the light-bearing Ether.

THE MYSTERY OF THE ETHER WHICH FILLS ALL SPACE

We do not know what this ether is. Itself non-luminous, it is the vehicle of light. It is not matter, but the powers of matter are latent in it. It offers no resistance to the passage of matter, yet it is supposed to be more rigid than the hardest steel. The most delicate experiments have utterly failed to prove its material existence, and the most that can be said of it, if it truly exists, is that it shows that the things which are not apparent to our senses are infinitely more important than those which are apparent.

But if we have to take the ether on trust we are less at a loss when considering the ripples of light which pass through it. The qualities ascribed to the ether are those which best fit the observed facts of the passage of light or the action of gravity and magnetism at a distance. In science it has, nevertheless, often been shown that an explanation which appears to fit the facts is not necessarily the only one or the right one, so the ether is still on trial, until a better explanation of the passage of light can be found.

So, also, if we choose to take the idea of the ether as a starting-point of theory, then not only light and the radiant heat which blazes from the sun and other bodies, but the invisible rays of light which cannot be seen by our eyes because their wave-length is too short, and X-rays which are the simplest form of light, and have a still shorter wave-length, and electromagnetic waves of all kinds, all use ether ripples of various lengths from crest to crest. They are, we may say, *states of movement in the ether.*

THE WHIRLING ELECTRIC FORCES WHICH MOVE AT TERRIFIC SPEED

Throughout the nineteenth century and well into the twentieth this idea of movement in the ether served to explain all these occurrences; furthermore, the ether was called on to account for the existence of states of matter.

We have already shown how the investigations that have taken place since the discovery of radium have convinced scientific men that the smallest possible particles of matter are not hard, unbreakable specks of matter, but are truly systems of electric forces which are whirling about one another. These electric forces are the electrons, and the electron, which is neither a speck of matter nor merely a state of motion, but something between, can be thought of as the smallest possible particle of electricity: an atom of electricity perhaps. Nineteenth-century science knew very little about these things, though it may have suspected their existence. But such ideas as were then prevalent about these or similar bits (or charges) of electricity were joined up with the idea that they were a kind of knot or strain in the ether. Matter itself was an assemblage of such knots or strains. That was the nineteenth-century way of saying that matter itself was formed out of the ether.

Let us examine more closely how motion, whether supposed to be a motion of ether or a motion of electrons, can produce the effect of solid matter—or of light or of heat. Heat as we know it appears to be of two kinds: the radiant heat coming from the sun or a blazing furnace, and the heat of a hot object, like a hot-water bottle, or of hot water itself. The heat of hot water is supposed to be due to a to-and-fro movement, an *oscillation*, of the atoms or molecules of the water when heated.

As a rule, when a thing is made hot it gets bigger, and this means that part of the size of the thing is due to its heat—that is to say, to *motion*. May it not be that the atoms and molecules themselves owe their existence to motion? There are many experiments which make it probable that this is true; one of the most remarkable may be mentioned. Can we believe that the hardness, the stiffness, the firmness of a thing can be made simply by the fact that it is moving? If we could suppose this, then we could suppose that the movement of the ether, or of elec-

it to make a hole through the wood without itself being injured. Again, we may take a piece of soft tissue-paper, stretch it out, and spin it at great speed, and it will cut like a knife. We have made it hard by making it move at such great speed. This seems incredible, but it is true nevertheless.

Now, wherever we find motion we know there must have been either some other motion of which this is the continuance, or else some power has been spent somewhere to produce it. When a ball leaves the arm, the motion of the ball and the



So hard is a stream of water forced from a hose under tremendous pressure that if it were struck by an iron bar it would bend or break the bar.
Photo by Burton Holmes, from Ewing Galloway.

trons, could make it into matter—which we think of as something hard. Now, if we take a ring of chain which simply lies in a heap on the floor, and get hold of it in such a way that we can make it spin at a tremendous rate, it becomes quite stiff, as if it were made of one piece of solid steel; and it will run for a long distance like a stiff hoop until the spinning, or rotation, of it has been exhausted, and then it will collapse into a little heap of links as at first. The movement made the loose chain into a stiff thing.

Another illustration of this is the firing of a candle through a wooden door, the motion imparted to the candle enabling

power of it have been derived from the power in the sugar of our muscles when the ball was thrown; and so in every case. This great principle, which is true not only of motion but of everything else, has a name which is rather long, but is not really difficult; it is called the "Conservation of Energy." Energy is a special word for power, and the Law of Conservation states that power is never lost; it is also part of the law, though the name does not say so, that *power is never made out of nothing*.

One of the ways in which this shows itself is in what is known as Newton's first law of motion. Everyone should

know this, for it applies to everything. It is often called the Law of Inertia, which simply means "doing nothing."

WHY MOVING THINGS DO NOT GO ON MOVING FOREVER

This law says that *when a thing is moving it does nothing itself to change its motion*. It therefore will go on moving forever, in exactly the same direction and at the same speed, unless some other power stops it, or turns it, or makes it go slower or faster.

That is half of the law of inertia, but only half of it; and it is given first because it is the half that people usually forget when they talk about inertia. The half that most people know is really the same thing, but looks different. It is that *when anything is at rest, it remains at rest, doing nothing, until something moves it*. Whenever we think of inertia, or Newton's first law of motion, we should remember both halves of it, or, rather, the two ways in which the law works.

Everyone understands how it applies to a thing that is not moving, but very few people remember how it applies in the other direction. They do not know that a thing which is moving will not stop unless something stops it.

WHY A BALL FALLS WHEN IT IS THROWN INTO THE AIR

We see a ball thrown up into the air, or thrown over the surface of the earth, and we know the motion ceases. This is our experience with practically all motions, and so we get the idea that when a thing moves it gets tired after a time and stops. It was one of the most tremendous discoveries ever made that this is not so, and that the smallest touch applied to the biggest thing, sufficient to move it at all, will keep it moving at that speed and in that direction forever. When a ball thrown up is stopped, the earth by its pull stops it, and the resistance of the air also helps in the stopping. When a ball running along the ground stops, it does so because the resistance of the air and the friction of the ground stop it. The real tendency is for the thing that is at rest to remain at rest, and for the thing that is moving to go on moving. If we think of the matter we shall see that if things did not behave in this way the law of the conservation of energy would not be true.

If things could be started moving without anything moving them, the power (or

motion) would be made out of nothing; if moving things could be stopped without something stopping them, motion would be made into nothing. That is what we mean when we say that Newton's law is really a special illustration of the great law of conservation.

Newton discovered two more laws of motion, thus making three, which will always be known by his name. The second law is quite simple. It says that *when anything is made to move, its motion is in strict proportion with the force that makes it*. Further, the thing moves in the direction of the straight line in which the force acts. This is true even if there are twenty different forces acting in different directions on a body, and it is true whether that body is at rest or already in motion.

THE BALANCE OF FORCES THAT BRING ABOUT A STATE OF REST

Using this law, it is possible for us to find out exactly in what direction and at what rate a body will move, if we know the power and direction of any number of forces that may be acting on it. We discover also the profound truth that rest is a state of balance of forces; forces are pulling, but other forces are pushing. These exactly oppose each other, and so the result is rest. Gravitation is pulling this book as it lies on the table, but the strength of the table resists the force of gravitation, and the book remains at rest.

Newton's third law of motion is that *action and reaction are equal and opposite*. This great law, which is really another version of the law of the conservation of energy, is very well illustrated in the recoil of a gun when it is fired. The momentum and force of the rifle as it kicks back are *exactly equal and opposite to the momentum and force of the bullet as it goes forward*.

All these laws are of supreme importance, and though we may not be able to understand all their details, we should certainly know something about them.

If we study them until they are firmly fixed in our minds, we shall have made a beginning in the great subject of physics. There is much more to learn, and we can give only a few of the leading principles in the succeeding chapters of the Book of the Earth. Great books have been written about the subjects treated in each one of our chapters.

THE NEXT STORY OF THE EARTH IS ON PAGE 4795.

The Book of Familiar Things



The children of a Dutch spectacle-maker discover the principle of the double microscope.

THE STORY OF THE MICROSCOPE

NOBODY can say when men discovered the magnifying power of a lens.

As soon as glass was known the idea of magnifying vision would probably be obvious to any observant eye, for most people quickly notice that a bottle full of water enlarges letters and objects seen through it. Even before the discovery of glass any transparent pebble shaped like a lens would have taught an intelligent boy the magnifying power of lenses. A lens of rock crystal was found by an Englishman, Sir Henry Layard, in the middle of the nineteenth century among the ruins of the palace of Nimrod at Nineveh.

But magnifying glasses could hardly be put to scientific use by unscientific people unable to guess the importance of infinitesimal things. Though lenses were used in the thirteenth century as spectacles to assist the failing sight of old people, four more centuries passed before the microscope was more than a crude toy. Early in the seventeenth century Galileo invented an improved microscope which was supplied with a concave mirror—"concave" meaning "hollowed inward." Within about fifty years after Galileo's invention was announced, Robert Hooke made lenses of considerable magnifying

CONTINUED FROM 4552

power out of globules formed by fusing threads of spun glass. This remark-

able genius, who was appointed Curator of the Royal Society of England two years after its formation, made many re-

searches with his microscopes, and wrote a most interesting account of his observations.

There was no end to the curiosity of Robert Hooke. He examined and described nettle-stings, bee-stings, flies' feet, birds' feathers, fishes' scales, fleas, lice and spiders. Perhaps his most important observation was the discovery that cork is made up of "little boxes or cells," for that was the first inkling the world had of the supreme fact that all animals and plants are built up out of just such tiny boxes or cells. Hooke himself did not, of course, realize the general application of this great fact. That was not realized till many years after his time. But Hooke was the first man to describe the cells or bricks of which all organisms are built through the whole kingdom of nature.

Another great man who comes into the story of the microscope lived at the same time as Hooke—the Italian Malpighi, who describes numerous interesting and accurate microscopical discoveries that he made. He was the first

to examine with a microscope the structure of the lungs, and he discovered the breathing tubes of insects and the pores of leaves. Still more indefatigable, if that was possible, was the Dutchman Jan Swammerdam, who worked all day long till his eyes grew weary. Among the interesting things he discovered were the facets on the eyes of bees, and the red blood cells in the blood of frogs.

THE NEW WORLD A DUTCHMAN SAW THROUGH HIS MICROSCOPE

All these observers, so enthusiastic and industrious, might have discovered much more if they had had double-lensed microscopes, or even better and stronger single lenses. A great step forward in the making of lenses came when the famous Dutchman, Anton van Leeuwenhoek, appeared in the middle of the seventeenth century. He made the grinding of lenses a fine art, and with his improved microscope opened up quite a new world to the little group of men who were spending their lives in looking through lenses.

The microscopes made by Leeuwenhoek had only single lenses; but the lenses were so skillfully and accurately made and mounted that he was able to see objects unseen before by human eyes.

Leeuwenhoek's observations were very numerous and very accurate, and his descriptions of the strange things he saw are still fascinating to read. They must have been great and bewildering revelations to the scientific men of his day.

He was probably the first man in the world to see bacteria. He found them first in the tartar of the teeth. "To my great surprise," he says, "I found that it contained many very small animalcules, the motions of which were very pleasing to behold. The motion of these little creatures, one among another, may be likened to that of a great number of gnats or flies disporting in the air."

THE WONDER THE DUTCHMAN FOUND IN THE TAIL OF THE TADPOLE

He was also probably the first man in the world to watch the blood circulating along the capillaries. He watched it in a cock's comb, in a rabbit's ear, in a bat's wing, in a tadpole's tail, and he waxed enthusiastic over what he saw in the last:

A sight presented itself more delightful than any my eyes had ever beheld, for here I discovered more than fifty circulations of the blood in different places.

I saw that not only the blood in many places was conveyed through exceedingly minute vessels from the middle of the tail toward the edges, but that each of the vessels had a curve, or turning, and carried the blood back toward the middle of the tail in order to be conveyed to the heart.

Hereby it appeared plainly to me that the blood-vessels I now saw in this animal, which bear the name of arteries and veins, are in fact one and the same—that is to say, they are properly termed arteries so long as they convey blood to the farthest extremities of its vessels, and veins when they bring it back toward the heart.

Well might Leeuwenhoek grow enthusiastic, for he had seen one of the most wonderful sights that the eyes of a man can behold.

On page 6745 we can read the story of the making of glass. We know that there are many kinds of glass, among them, crown, bottle or green, flint, cut, pressed and optical. It is from optical glass that lenses for microscopes are made. In making optical glass the molten material is kept at an intense heat for eight hours or more and stirred with a special instrument made of fine clay until all bubbles of gas have escaped. It takes several days for the glass to cool. It is then broken up into pieces, and those with flaws are rejected. Perfect pieces are placed in disk-shaped clay molds and remelted to that shape. The final process is the annealing; or melting together, of two disks to make a lens. Afterward skillful glass-workers grind and polish the lenses.

THE DOUBLE MICROSCOPE THAT REVEALED NEW MARVELS

The simple microscope as used in the early days had merely one double convex lens, that is to say, a lens convex on both sides. Its magnifying power depended on the refracting power of the single lens, the power the lens had of breaking up, or refracting, the light. A lens with sufficient refracting power to focus light half an inch from its centre would increase its magnifying power many times, and a lens focusing light still nearer would magnify still more. The compound microscope was a great step forward. It has at least two lenses, an object-glass and an eyepiece. The object-glass magnifies the object as in a simple microscope, while the eyepiece magnifies the magnified image presented by the object-glass. Very much greater magnification can thus be obtained; for if, let us say, the object-glass presents

an image magnified twenty times, and the eyepiece magnifies the image another twenty times, the total magnification will be four hundred times.

As long ago as 1590 the principle of a double microscope had been realized. The idea had come to two Dutch spectacle-makers, J o h a n n and Zacharius Janssen. One or both of them received the first idea from his children, who happened to be playing with some lenses. They were holding the lenses up to look through them at various objects, when one placed a concave lens near his eye and held a convex lens some distance away in the same line. Suddenly he cried that the vane of the church spire had come nearer. His father, hearing his cry, came out and found that by looking through the lenses as his son was doing he saw the vane greatly magnified and brought very near to him. The spectacle-maker fixed the glasses on a board, and thus made the first telescope, which he presented to Prince Maurice of Nassau. Galileo, hearing of it, made a really useful telescope with the lenses fitted into a tube, through which he almost immediately discovered the mountains of the moon, the earth-shine on the moon, and also the four moons of Jupiter.

But there were many optical difficulties in the way of applying this idea so as to make an efficient double microscope, and not till the early years of the nineteenth century was this accomplished. It is interesting to note that the great Lord Lister's father played an important part in the improvement and development of the modern instrument.

To-day the double microscope is one of the most efficient and perfect instruments

in the world. The single microscope magnifies twenty or thirty times; the double microscope four or five thousand times. For most scientific purposes only the double microscope is now used. It is provided with fine screws to adjust the object lens so as to focus the object, with a mirror to reflect light and with a condenser to concentrate the light on the object.

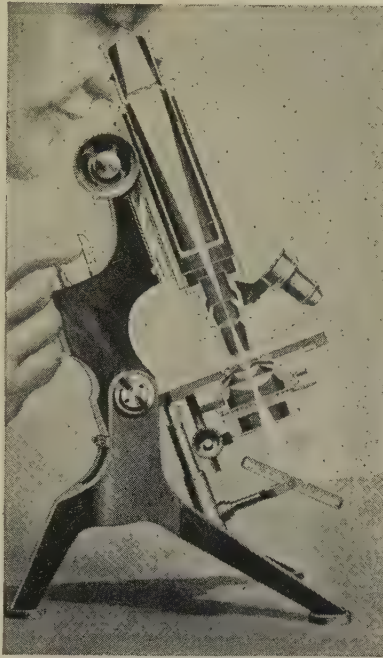
The microscope has now become essential to most of the sciences and to many of the great industries. Without the compound lenses the microbes of most diseases would have remained undiscovered, and our means of fighting disease would have been very small. Our knowledge of the constitution of all organic tissues and of the nature of the blood is dependent mainly on microscopic research. Without the microscope it would be almost impossible to diagnose disease in its early stages, or to understand the processes of growth and repair in animals and plants.

Even the great steel and iron industries cannot do without this wonderful instrument. It is used also in the study of foods, drugs, paints, earths, starches, and, in the form of the micro-spectroscope, even in the study of suns and stars.

The latest invention in microscopes is that of an Englishman, J. E. Barnard, of London. It was one of the new instruments built by

him that enabled Dr. Gye to announce the existence of a cancer germ. By means of this machine it has been found possible to take photographs with almost no light, or as learned scientists say, "with light of a wave length of 257 millimicrons" (a millimicron is a ten-millionth part of a centimeter).

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 4785.



This sectional drawing of the microscope shows how the light falls on the reflecting glass, passing through the condenser to the object on the slide-rest, and thence through the lenses to the eye.



Malpighi.



Robert Hooke.

SECRETS OF COMMON THINGS



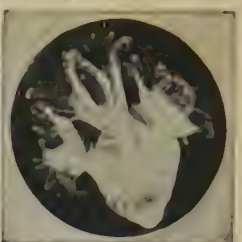
Tiny polysiphonia.



A chicken feather.



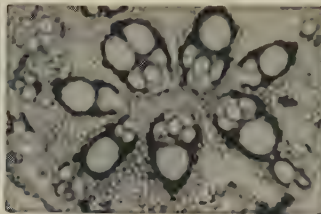
Guinea-pig hairs.



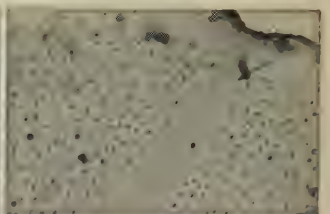
Fresh-water animalcule.



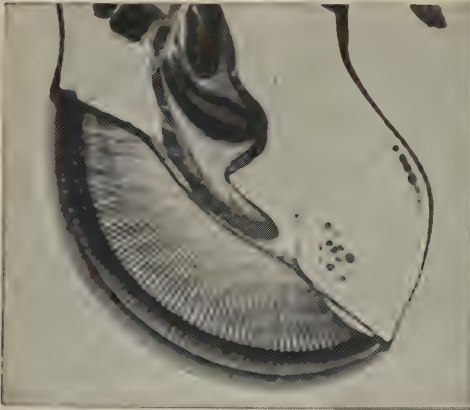
Inside a grain of barley.



Section of a pepper stem.



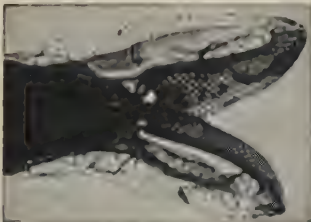
Under surface of a leaf.



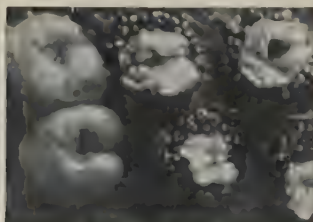
The eye of a honeybee.



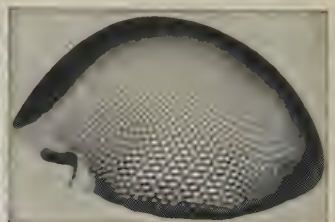
The palate of a limpet.



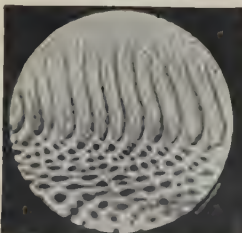
A drone fly's tongue.



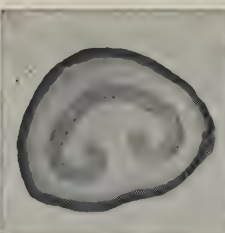
Seeds on a fern.



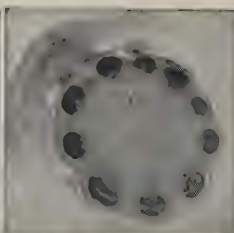
The eye of a fly.



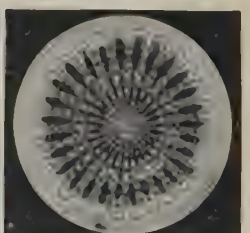
Part of a horse's hoof.



Section through a fern.

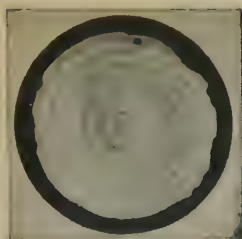


Inside a clover stem.

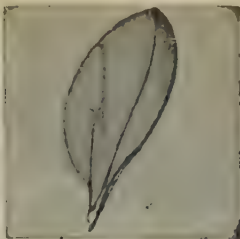


Spine of a starfish.

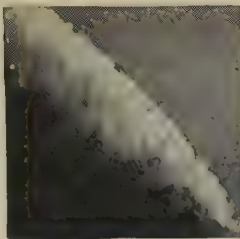
WHAT THE MICROSCOPE REVEALS



A shell.



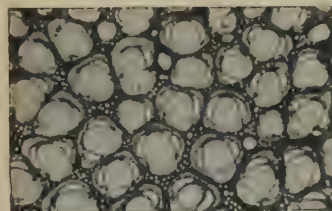
A gnat's wing.



A knife-edge.



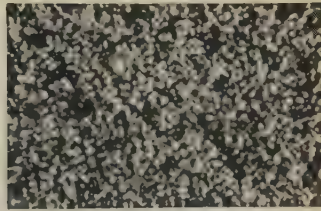
The labrum of a moth.



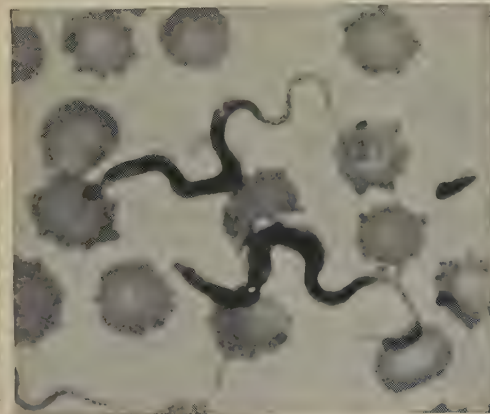
A section of cane.



Mouth of a tadpole.



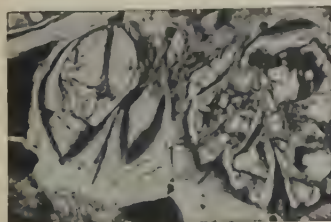
Dust on a shelf.



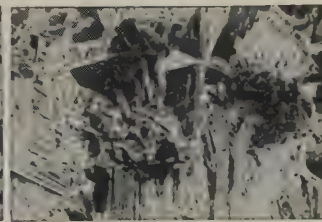
Parasite of the tsetse-fly.



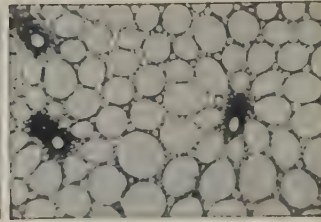
A needle's eye and a pinpoint.



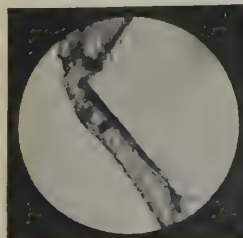
Fragment of a meteorite.



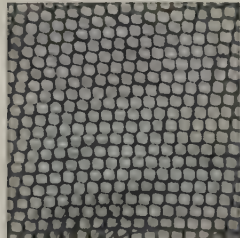
Ammonium-sulphate crystals.



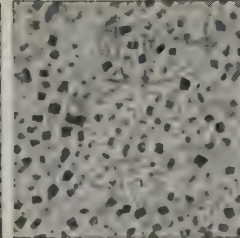
Through a water-lily.



Leg ear of a cricket.



Part of a fly's eye.



Crystals of salt.

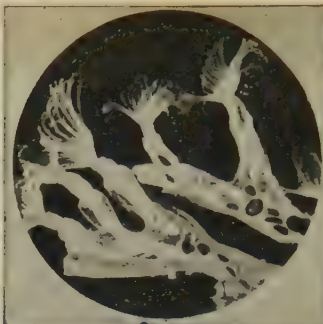


A beetle's paddle.

STRANGER THINGS ARE REVEALED



Parasite of the honeybee.



A freshwater polyzoön.



Parasite of the bumblebee.



Head of an orange-tip butterfly, showing its compound eye.



The antenna of a moth.



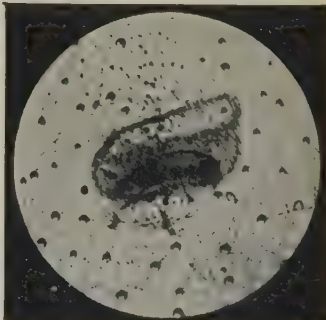
The leg of a frog-hopper.



A banded-legged spider foot.

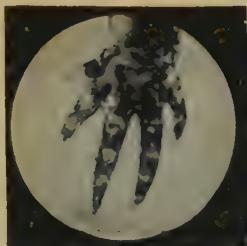


A jelly-like sea creature.

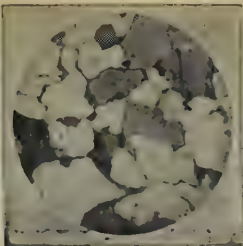


Spiracle of a worker bee.

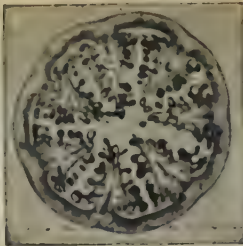
MORE WONDERS ARE REVEALED



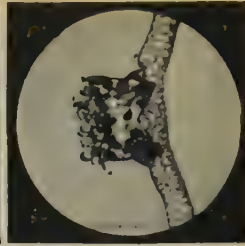
Foot of a newt.



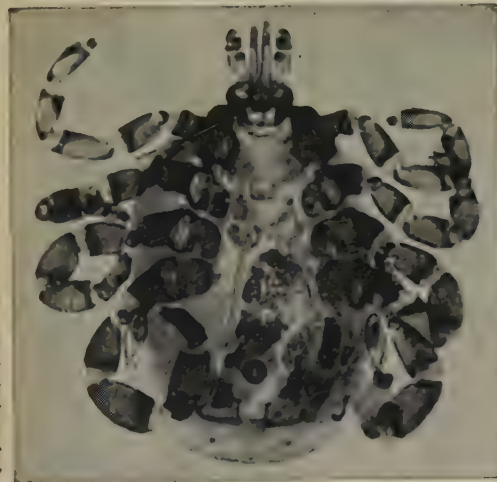
Gold-glass section.



The ovary of a poppy.



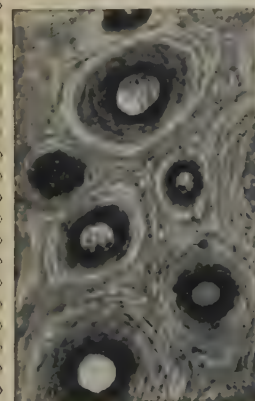
The leaf of a fern.



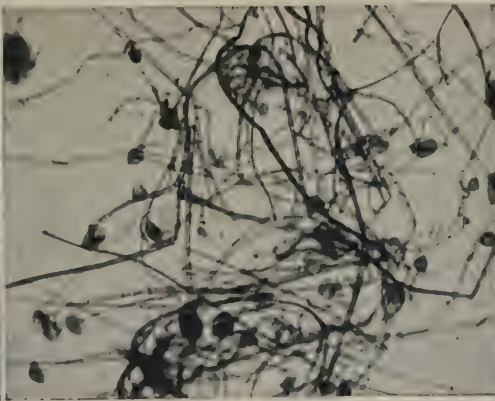
A parasite that lives on a tortoise.



The head of a centipede.



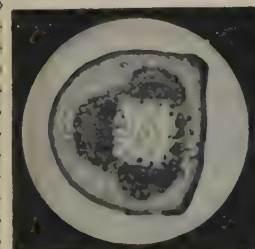
A piece of whalebone.



A vegetable mold.



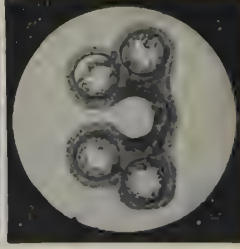
A piece of human bone.



Currant leaf-stalk.



A phonograph needle before and after use.



An anther of a lily.

SOME ANIMAL LIFE ENLARGED



Saw of a fly.



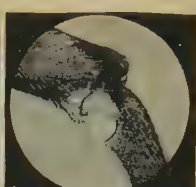
Hydratuba.



House spider.



Diatoms.



A bee's leg comb.



Plates from a sea-cucumber.



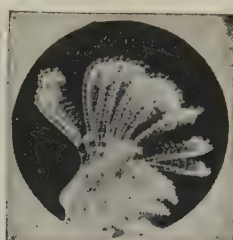
Bee's sting and needle-point.



Skeletons of sea workers.



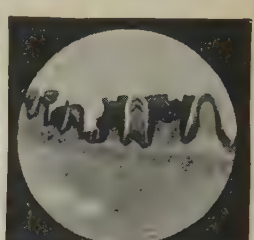
The jaws of a spider.



Barnacle plumes.



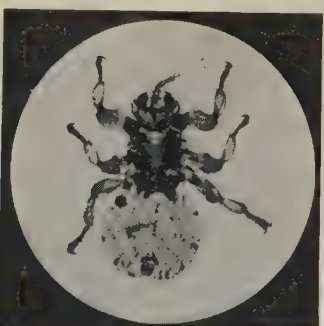
Freshwater flea.



A cat's tongue.



Spicules from a sponge.



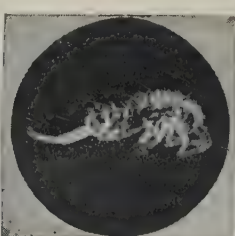
The sheep tick.



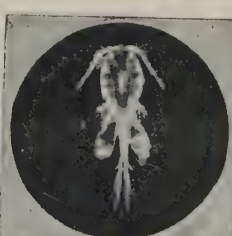
The brittle starfish.



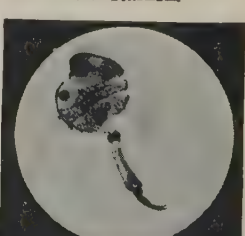
Honeybee pollen comb.



Hairy-backed springtail.

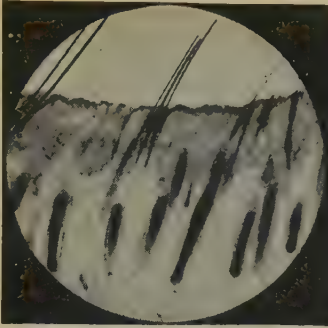


Cyclops with egg-sacs.



Water-beetle foot.

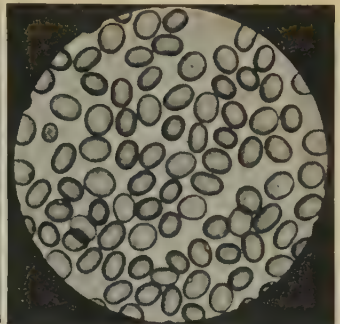
QUEER OBJECTS APPEAR AT TIMES



The scalp on our heads.



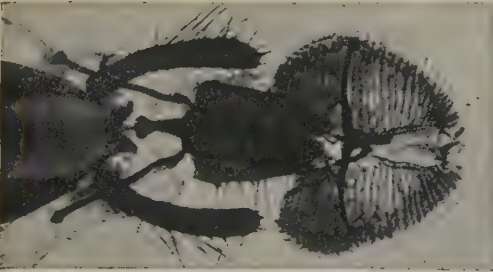
Spines of a starfish.



Eggs of a sponge.



The scales in a speck of dust from a moth's wing.



Tongue of a house-fly.



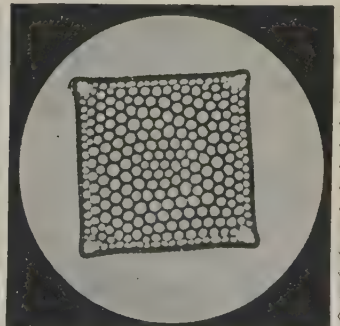
Head of an *Anopheles* mosquito.



The dog flea.

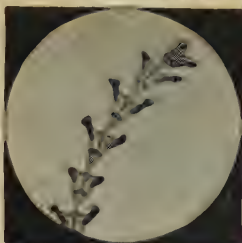


A duck parasite's eggs.

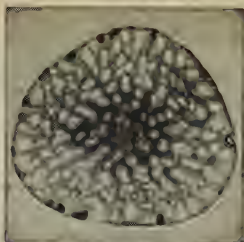


A South Sea diatom.

STRANGE THINGS THE GLASS SHOWS



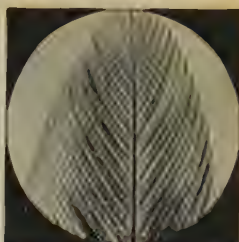
One of the hydrozoa.



An elephant's hair.



A porcupine's quill.



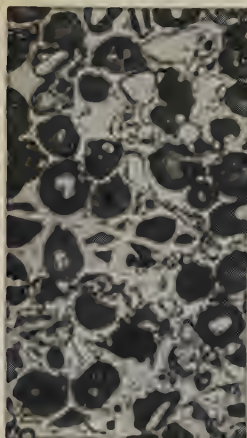
Humming-bird feather.



The larva of a pond-skater.



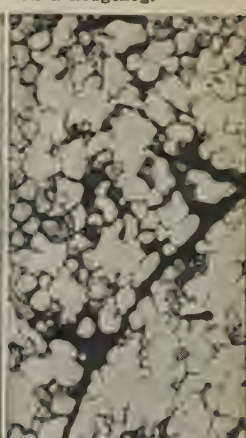
A flea that lives on a hedgehog.



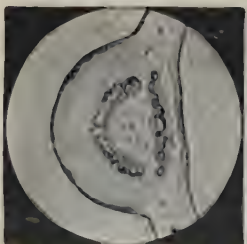
Piece of limestone.



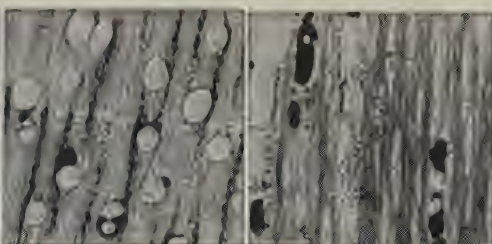
The breathing apparatus of a silkworm.



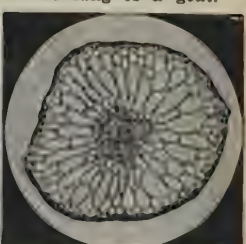
The lung of a goat.



A rubber-plant leaf.



Two sections of mahogany.



The stalk of villarsia.

The Book of All Countries



The famous castle at Cracow, the ancient capital of Poland.

POLAND AND ITS PEOPLE

IF we look at a map of Central Europe we see a vast plain stretching from the Baltic Sea to the Carpathian Mountains. It is the cradle and home of the Polish nation.

The Poles, like the Russians, Czechs, Serbs and Ruthenians, belong to the Slav branch of the great Aryan race. No one knows when they settled down in Europe; but it is certain that the Poles of to-day are the direct descendants of the Poles of two thousand years ago. Even their language has not much changed, and the Pole of to-day could easily understand a Pole of the tenth century. The Romans never tried to conquer Poland, though they must have known it, as one of the Roman chroniclers mentions a country beyond the Carpathians where strange people lived who played the flute most beautifully but did not know the use of a sword. Most of the Slavs were gentle and peaceful. They tended sheep and cattle, and were clever at bee-keeping and fishing. The women used to spin and weave their own clothing while the men hunted in the big forests.

In some parts, where the old forests were cleared, men used to till the ground, using primitive wooden plows. Slav territories reached as far as the Rhine in Germany of to-day, but unhappily those peaceful people had German neighbors who were war-

CONTINUED FROM 4576



like. They wanted the rich land of the Slavs.

To make it appear right they proclaimed a crusade against the pagan Slavs. Whoever rejected Christianity was killed, and his land was taken by Germans. They pushed their frontier farther and farther eastward, until their advance was stopped by the Poles.

The danger of a German invasion taught the peaceful shepherds of the Polish plain to use weapons and to organize their country under one leader. There is a legend of a Polish princess Vanda who preferred to drown herself in the river Vistula rather than marry a German knight who wanted to get hold of Poland by marrying the prince's daughter. Her father founded Cracow, the old capital of Poland, and the legend says he killed a terrible dragon who endangered the life of all the inhabitants. Visitors to Cracow can still see the dragon's cave by the Vistula, below the King's Castle. They can also see on the outskirts of the town two grave-mounds set up by the Poles long, long ago in memory of Prince Krak and his daughter Vanda.

At the end of the tenth century Poland adopted Christianity. It happened during the reign of Mieszkoi, of the dynasty of Piast. The founder of that great dynasty was said to be

a wheelwright, and was chosen after the death of Prince Popiel to be leader of the nation, because "he was an honest man and a good worker."

His descendants reigned till the end of the fourteenth century. One of them, Boleslas the Brave, became the first king of Poland in 1025. He had a wonderful mind, but unhappily his contemporaries could not grasp his ideas. He dreamed of a great union of all Slav nations, a union strong enough to hold in check the Germans who were at this time spreading toward Eastern Europe. Unhappily, this dream never came true, and Poland had to suffer for it, being attacked over and over again.

WHEN POLAND STOOD LIKE A SENTINEL AT THE GATES OF EUROPE

But the Germans were not the only threat to Polish freedom in those days. In the thirteenth century hordes of Mongolian Tartars swept in from Asia, conquering Russia and then attempting to break through Poland to the west of Europe. But they never succeeded. Poland stood at the gates of Europe like a faithful sentinel, barring the way of all barbaric hordes that might have been a menace to civilization. She fought, she struggled, she suffered, in order to stem the tide.

There are still certain customs in Poland which come down from these Tartar invasions. One is the pageant of Konik (the pageant of the Little Horse), held in Cracow every year. It commemorates the brave deed of Micinski, a Polish hero who saved Cracow from the Tartars by galloping all night through the countryside, rousing the people against the advancing hordes. A peasant dressed in old national costume rides a hobby-horse in the streets of Cracow, rousing the crowd with an imitation mace stuffed with straw. He is heralded by drums and whistles and by the delighted shouts of children who love to get in his way.

THE STORY WHICH THE MUSIC FROM THE CHURCH TOWER TELLS

Another old custom is the Hejnal, an aria played by a trumpeter from the top of Our Lady's Church tower in Cracow. From six in the morning till midnight, at every hour, the Cracow trumpeter blows his little aria, facing in turn north, south, east and west. His music dies away on a suspended note—a note no ear can forget having once listened to it. The aria tells

the story of how the Tartars came one day to destroy the royal city of the Poles; how the watchman in the tower of the Church of Our Lady saw them from his look-out and gave the signal to the people; how an arrow of the invader struck him in the throat and broke the unfinished note of his bugle call. Never since, through all the centuries, has the Hejnal been played to its final note.

The last Piast ruler that reigned in Poland was Casimir, called the Great. It is said that he "found a Poland of wood and left a Poland of brick." He founded the first Polish university in Cracow in 1346, and many of the beautiful buildings in that town were built during his reign. He also allowed the Jews to settle in Poland, and from that time on, during all the persecutions of Jews in Western Europe, the children of Israel have flocked into Poland from England, France, Italy, Spain, Germany and Bohemia.

THE GENEROUS LAND THAT GAVE SANCTUARY TO THE REFORMERS

In all the long history of Poland nobody has ever been persecuted by the Pole for his religious belief. This religious tolerance brought to Poland at the time of the Reformation Protestant families who, escaping persecution at home, found in this country peace and shelter. Their descendants can still be found in Poland among families bearing such un-Polish names as Morris, Darnley, Brown, Clark and so on.

One of the most prominent figures in the Polish history of the fourteenth century, after Casimir, is Casimir's granddaughter, Jadwiga. She was elected queen of Poland at fifteen. A beautiful and very clever girl, she was the protector of the poor and the patron of scholars. She married the Lithuanian prince Jagiello, so uniting the two countries and bringing Christianity to pagan Lithuania. This country had been invaded over and over again by the German Knights, who tried to convert it by fire and sword, but the people dreaded the sign of the Cross, and refused to be christened. After her wedding Jadwiga went there as a missionary, and her smile soon conquered where the sword had failed. Yet this sweet girl-missionary could also, when needed, draw the sword and lead her army against Poland's enemies. She died very young, leaving all her precious jewels and treasures to the University of Cracow.

TYPES OF ANCIENT BUILDINGS



The grim-looking Castle of Mir, near Vilna.



The Town Hall of Poznan.



The Cathedral at Lemberg.



The Cathedral at Czenstochowa.



A church in Vilna.

The rule of the Jagiellonic dynasty is marked as the golden age of Polish history and literature. Poland became a powerful country: her frontiers stretched from the Baltic to the Black Sea, her princes reigned in Hungary and Bohemia. The University of Cracow, the oldest in central Europe after Prague, became a centre of learning; as were also the academies of Vilna, of Zamosc and Lemberg (Lwow). Polish science in the fifteenth and sixteenth centuries was in no wise inferior to that of the west. This was the time of Nicholas Copernicus, the greatest Polish astronomer, and of Andrew Modrzewski, the great political writer. Prose and poetry kept pace with science. Kochanowski, the prince of Polish poets, wrote there his immortal *Treny*, a cycle of poems which describe his great sorrow after the loss of a beloved child. The prose of Rey and Gornicki, the eloquence of Peter Skarga, were all worth while. It may perhaps be said that the whole nation enjoyed in these times as much liberty as, perhaps more liberty than, any other in Europe.

**PEOPLES OF MANY NATIONS WHO
LIVE IN PEACE TOGETHER**

Within the Polish commonwealth, the Poles of different provinces lived side by side with the most various nationalities, such as Lithuanians, Ruthenians, Germans, Prussians, Courlanders, Jews, Tartars, Armenians, and no one tried to change the nationality of another. The Germans in the towns were governed by German law, the Jews by Jewish law, the Armenians by Armenian law and so on.

Everybody who did something important for the commonwealth became a noble, and had not only the right to vote but the right to be elected king. The nobility soon became so numerous that it grew to be ten per cent of the whole population. The king of Poland, was, in fact, a president elected for life by the people. At first only princes of the same dynasty were elected, but after the death of Sigismund Augustus, the last of the Jagiellos, any foreigner or Pole of the simple rank of gentleman could become a candidate for the throne. The result was that many foreign princes competed for the Polish crown, and their reigns were in most cases complete failures. The last great Polish king, John Sobieski, became well known all over Europe as the Defender of Christianity.

In 1683 the Turkish invasion reached as far as Vienna. The Austrian emperor Leopold had no more strength to defend the capital. He sent messengers to the Polish king asking for help, and Sobieski came to Vienna with his faithful army. The mere sound of his name filled the Turks with terror. They had met him in battle, and they knew the power of his sword. The morning before the great battle Sobieski went to a little chapel on Kahlenberg, a hill near Vienna, to hear Mass, and after having received the Holy Communion he went to the battlefield. The Turks were defeated, but Sobieski never boasted of the victory that saved Europe. He sent home a message in the words of Julius Cæsar (*veni, vidi, vici*) with a slight alteration. He wrote: "I came, I saw, God conquered."

**THE DARK DAYS FOR POLAND
WHEN JOHN SOBIESKI DIED**

After Sobieski's death two German princes reigned in succession. They brought corruption into the country and plunged it into complete chaos. One of them started a conspiracy against Poland, and a civil war broke out which weakened the country and made it a prey to its greedy neighbors. In 1772 Russia, Germany and Austria marched their armies into Poland and occupied several provinces, reducing her area from 304,000 square miles to 216,000 square miles. The country was almost defenseless, with practically no army and no money. It set to work. An education committee was organized in 1773, which must have been one of the first boards of education in Europe, if not actually the first. It covered the land with secondary and primary schools accessible to all, while a society furnished them with excellent schoolbooks.

**THE SPLENDID REFORMS THAT
CAME JUST TOO LATE**

Then, before many years had passed, the country opened a splendid network of roads and developed its industries, in spite of the difficulties created by Prussia. In 1791 a constitution was passed which brought many radical reforms. It granted liberty to every Pole as a free citizen, and free education to every Polish child. Unhappily all this came too late. Russia, Germany and Prussia renewed their violence. A second partition took place in 1793, and a desperate struggle began.

BUILDINGS AND STREETS IN WARSAW



Calvinist Church, Warsaw.



Jewish Market, Warsaw.



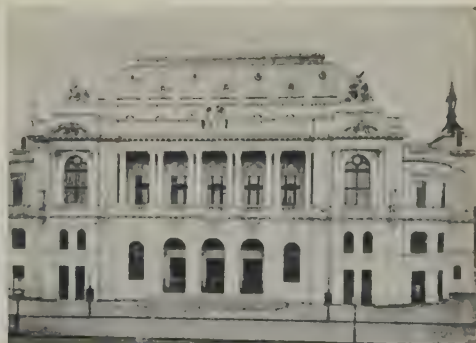
St. Florian's, Warsaw.



Zamkowy Square in the centre of Warsaw.



The Polytechnic, Warsaw.



Philharmonic Hall, Warsaw.

The whole nation, led by Thaddeus Kosciusko, rose against its oppressors. Peasants as well as nobles joined the ranks of the voluntary army. Not a single power came to help Poland in this last campaign, and in spite of all the courage and heroism shown by the Poles they were defeated. Kosciusko himself was grievously wounded and taken prisoner. The Russians stormed Praga, the suburb of Warsaw. Thousands of men, women and children were massacred. Warsaw was forced to capitulate. Now (in 1795) the final partition took place, and Poland was wiped out from the map of Europe. She had ceased to exist as an independent state.

But she went on living in the heart of every Pole. To the Poles every home was Poland, every child was Poland. They had to suffer unspeakable agonies for being Poles. Only Austria, who had the smaller part, granted them a certain amount of freedom. Russia and Germany persecuted everything that was national. Poles were not allowed to speak their own language in public, to sing national songs, to read their own literature. There are cases of Polish children being severely beaten for refusing to say their prayers in German. Every sort of treason against Poland was encouraged by her enemies, and no Pole was admitted to government office unless he consented to become the enemy of his country.

THE TERRIBLE DAYS OF POLAND UNDER THE RUSSIAN TSARS

Life in Poland was very sad at that time, and people in the west of Europe cannot have dreamed of the terrible suffering that was going on so near. Russia had a special spy-system for her Poles, and none was ever safe from spies, even in his own home. People were stopped in streets by the police, their pockets were turned out, and if anything suspicious was found they were sent to prison. Even in the night the police would go into Polish homes. People were turned out of bed, the house was searched, and often the father or the son would be taken away, never to be seen again. People were taken to prison for no reason at all, and kept there for months, for there was no appeal.

Thousands of Poles were suffering hunger and cold in the damp, dark Russian prisons, thousands were sent to Siberia to the hard work of the mines,

their only crime being that they were Poles. They loved Poland more than wealth, more than happiness, more than life itself. The main high-road to Siberia is called by Poles the Polish Golgotha. Along this road every year hundreds of Poles were driven, side by side with the worst Russian criminals. The convicts had to walk all the way, in storm or frost or snow, and if one lingered behind he was beaten with long leather whips with sharp lead ends by mounted Cossacks driving men like a herd of sheep. Sometimes a man dropped in the middle of the road, and even leaden whips could not force him to get up; he died where he fell, and no one troubled to remove his body. It was left to the wolves.

THE YEARS OF MISERY AND SLAVERY IN THE SIBERIAN MINES

In Siberia most of the convicts were taken down into the mines, where they were chained to the wheelbarrows so that they could not escape. They were kept there for ten, twenty, thirty years, or for life. If they were released sooner, it was probably because they were mad and their keepers wanted to get rid of them. Sometimes Poles were sent to Siberia as settlers. They were given a certain area where they could live, but were never allowed to go back to their homes in Poland. Many of those settlers did wonderful work among the native tribes, teaching them useful crafts. They were their doctors, their teachers, their prophets.

One Pole spent twenty-five years as a convict on the island of Sakhalin. All that time he was helping the natives in every way, teaching them to use their hands and their brains, healing their sick, telling them wonderful things about the world and about God, until the natives began to worship him. They would bring offerings to him, burning incense round his house, and when he had to leave the island they mourned and wept like children.

THE DESPERATE ATTEMPTS OF THE POLES TO THROW OFF THEIR CHAINS

The Poles tried many times to free themselves from their oppressors. There was an insurrection in 1831, and others in 1846 and 1863, but they failed, in spite of the tremendous sacrifice the people made. Every insurrection was followed by more and more suffering, yet the soul of the nation remained unbroken.

POLAND, LITHUANIA, LATVIA AND ESTHONIA



This map shows four of the new countries carved out of Russia after the World War.

Polish literature and Polish art blossomed in spite of all. The very bitterness of life gave to Polish art a touch of something sublime. During the insurrection of 1831 Chopin, Poland's greatest composer, wrote his immortal *Etude* and *Prelude*. When Nicholas heard them played he exclaimed: "This music is dangerous! It is like guns hidden under beautiful roses."

**THE ARTISTS WHO WERE STIRRED WITH
A GREAT LOVE OF THEIR COUNTRY**

Chopin's contemporaries were Adam Mickiewicz, Julius Slowacki and Sigmund Krasinski, the three greatest poets of Poland. They were followed by the painters Arthur Grottger and Jan Matejko. In the works of all these artists the love of Poland finds its deepest expression. Every line of their poetry, every picture, is filled with it. No wonder the reading of such literature was prohibited, yet it was read because it gave the people new vision. Poland in the eyes of its poets was the Christ of the nations. She had to suffer as Christ suffered, she had to be despised and forgotten, she had to be tortured and crucified and buried to rise one day in splendor and glory, even as Christ had risen. They saw in her suffering the purifying fire that would help her to grow nobler.

"The world lays its hopes on the nations that have faith," says Mickiewicz, and indeed he saw that faith in the Polish nation. That is why he says to the Poles in his *Polish Pilgrim*:

Verily I say unto you—ye must not learn civilization from alien nations, but must teach them the true Christian civilization.

Each one of you hath within his soul the seed of the nation's future laws and the measure of her boundaries. As much as ye make your own souls greater and better, so much will ye better your laws and enlarge your boundaries.

**THE TEMPTING BAIT THAT THE
POLES WOULD NOT TAKE**

The dream of the poets came true sooner than anybody expected. Poland has regained her independence, but before that happened she had to pass through one more trial, harder, perhaps, than any before. At the beginning of the World War Germany, Austria and Russia were lavish in promises if the Poles would give them their support. They all promised Poland freedom and independence. But the Poles did not trust them. Nevertheless, they were forced to fight in enemy armies side by side with Germans and

Austrians as well as Russians. Poles had to fight against Poles, brothers against brothers. Over and over again whole regiments refused to fight. They threw down their arms and were shot on the spot by the German, Russian or Austrian regiments behind them. Many Polish soldiers escaped to France, Italy or Serbia to join the armies of the Allies. There was a Polish Legion in France fighting under French leadership. Meanwhile, all through the war, the German, Austrian and Russian armies were fighting on Polish soil, burning Polish towns and villages, destroying Polish homes. In 1918, after four years of war, the country was a heap of ruins. Thousands of people had to live a wandering life. Their homes were burned, their fields were a mass of shells, they had nowhere to live and scarcely anything to eat; yet they clung to their bit of soil, refusing to be driven into Russia or Austria. There were areas where people lived in caves dug in the ground. Terrible epidemics were spreading all over the country, and the death-rate was very high.

**HOW POLAND SHIELDED EUROPE FROM
THE BARBARISM OF THE EAST**

But help was at hand. The Treaty of Versailles made Poland a free and independent state in 1919. The three parts were joined again into one, though the new Poland was only about half the size of the Poland of 1772. But no sooner had the country regained her freedom than the Bolshevik army invaded her, burning the harvest in the fields and destroying everything that remained still undestroyed. This happened in the summer of 1920. Once again Poland was called upon to shield the rest of Europe from the eastern barbarism, and it succeeded. The Polish army was weak; there were not enough men to fill its ranks, but the women, the old people and the children rallied. There was a regular women's battalion fighting at the front, and many women and girls fought disguised as men. Whoever could carry arms hurried to defend the country. The pluck and courage of many Polish boys and girls (mostly Boy Scouts and Girl Guides) were beyond all words.

The Bolsheviks were defeated, and Poland could settle down at last to do peaceful and constructive work. Her new constitution is republican, with a President and a Parliament, called the Sejm,

IN POLAND'S BEAUTIFUL CAPITAL



Statue of Mickiewicz.



St. John's Cathedral.



Palace of Sigismund III.



The bridge across the Vistula at Warsaw which leads to Praga.



The Summer Theatre in Warsaw.



A crowded street in Warsaw.

with two Chambers, one elected by all men and women over twenty-one and a Senate elected by all men and women over thirty. There are several women deputies. But to do her peaceful work Poland was forced to keep up a large army, which burdened her and kept her poor. It is necessary only to look at the map of Europe to see why this is so.

THE REVIVAL AMONG THE POLES OF THE SPIRIT OF OTHER DAYS

The new and inexperienced Government had at first a difficult task to face. The country was in ruins: ravaged by epidemics and starvation, the people were all tired of war; there were no funds in the treasury, and the leaders of the nation had been allowed no experience in ruling a nation. Yet it is surprising how much was accomplished. The people pulled themselves together to work. The shattered towns and villages have been rebuilt, schools and factories are springing up all over the country; even art is reviving. Painters such as Chelmonski, Ruszczyc, Tetmajer, and Mchoffer (who designed the beautiful stained-glass windows in Fribourg Cathedral, Switzerland); poets like Staff, Tetmajer and Kasproicz (the brilliant translator of many English poets); novelists like Sienkiewicz, Reymont, Zeromski, Weyssenhoff; musicians and composers like Paderewski (the first Polish premier), Karłowicz, Niewiadomski, Rozycki and many others, show that the sense of beauty and the art of expressing it are still fully alive in Poland. Given time and capital there is no limit to the development of this country. Her soil, especially in the eastern parts, is the richest in Europe. It has no equal except in Russia. Agriculture is done scientifically, and much Polish corn is exported to foreign countries. It is lovely to see the Polish plain in summer: vast stretches of land covered with cornfields. There are no hedges or ditches; all the fields run into each other so that they form one great mass of gold. In a breeze the fields look like a sea of golden waves with a spray of golden pollen above it.

THE FORESTS WHICH SURROUND THE FIELDS OF WAVING CORN

The fields are bordered with forests; pine and birch trees on light soil, with oak, beech, elm and elder trees on heavy soil. Especially in the east and north one seems to be surrounded by them;

they shut in every horizon. And how beautiful they are, with their wild life, teeming with elk and bison, bears, stags, boars, deer and hares roaming about freely! The war has done great damage to the wild life of Poland, but there is hope that under protection it will soon be restored.

Poland is the third forest country in Europe. She has over sixteen million acres of timber land, which supply many European countries. But there are more riches in Poland than corn and timber. Her oil-fields are among the richest in the world, though three hundred of the greatest wells were set on fire by the Russians before their retreat from Poland. Then there are salt-mines in Wieliczka, near Cracow, which turn out one hundred and forty million tons of salt a year. There are big coal-mines in the Black Country of Silesia, and zinc-mines and potash-fields in Malopolska. One of the chief Polish industries is the growing of sugar-beet and the manufacture of sugar. War ruined most of the beet-fields, and wrecked the sugar factories, yet four years of peace were enough to revive sixty-two of the largest sugar factories, which are once more producing, in spite of the great lack of machinery and fertilizers.

THE NEW LIFE COMING TO THE INDUSTRIES OF POLAND

Lodz and Zyrardow, near Warsaw, are the great textile centres. Their factories turn out woolen and cotton goods which can compete with any other country's. Silesian ironworks and foundries, Lemberg potteries and glassworks, the field machinery and engine factories of Poznan and Warsaw, are the pride of new Poland. Yet, with all the revival of her industries, Poland is and will remain an agricultural country. Poles are great lovers of the great out-of-doors, and work on the soil is always regarded as the noblest. The peasant clings to his land, however small it may be, for to him every bit of Polish soil is sacred.

Many of the poorest Polish emigrants who go out to North or South America to work take with them a handful of Polish soil. They keep it like a precious treasure, and if an emigrant dies in a foreign land this bit of Polish soil is placed on his heart and he is buried with it.

This love of the soil finds also its expression in a strange custom of erecting

ANCIENT POLAND'S CASTLES AND PALACES



The old royal castle and palace at Cracow.



The Tower of St. Florian, Cracow.



The castle at Poznan.



Suburbs of Cracow.



The Castle Hill, Graudenz.

high earth mounds in memory of historical people or events. We see such mounds near Cracow and near Lemberg, the Lemberg mound erected in memory of the union of Poland and Lithuania. A mound erected in memory of the Polish victory over the German Knights of the Cross, five centuries ago, was started near Niepotomice only in the year 1910. Thousands of people came from all over Poland, bringing with them little sacks full of earth from their fields or gardens. Two American Poles came across the

Atlantic and brought a sackful of the American soil on which they were laboring. Everybody emptied his sack on the spot, and a tiny hill sprang up like those made by children on the seashore. It grew and grew, people treading it down and turning more earth on to it, until it was so big that they had to climb up to throw the earth on the top. When all the sacks were emptied, people filled wheel-

barrows with the earth of the fields around, and went on building the hill, until at last it was so big that it took a long time to climb and could be seen from far away. Soon grass and flowers covered it, and people made a little wind-ing path up to the top, where travelers may rest and enjoy the lovely view.

Looking to the south, one can see from afar a long range of mountains, the Carpathians. They are the glory of the Polish landscape. Their western part, the Tatras, is wild and rocky. They are not rich in minerals, but they have more than that. They have the unspoiled beauty of wild country. In summer their valleys are covered with

exquisite alpine flowers. Herds of cattle and sheep graze on their slopes, and the air is filled with the sounds of rushing torrents, tinkling bells and shepherds' songs. Golden eagles build their nests in the granite cliffs, swift chamois and marmots live there side by side with bears. It is an enchanted bit of land, and tourists come there from all over Poland and from foreign countries to taste the joys of wild life and the thrills of climbing. In winter the landscape changes. Snow covers the ground four or

five feet deep. The junipers and dwarf pines disappear under the snow, and the brooks and streams make their way under white glittering arches. Then is the time for winter sports, skiing, bobsleighting, tobogganing. The small highland town of Zakopane is crowded in winter with sportsmen. All Poland meets here. Happily the war has not changed the Polish landscape. The mountains and the plains look the same. But

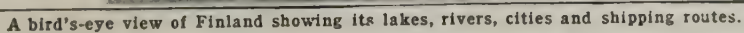
the changes are marked on villages and towns. The old-fashioned country houses, seeming to guard and protect the little villages around, have practically disappeared. They were Poland's treasure houses. They contained priceless collections of pictures, books, tapestries and arms. No money can restore them. They are lost forever, another sacrifice to war.

Cracow, the old Polish capital, has not been touched by war, though the Russian army was very close to its walls. All its beautiful old buildings were saved. There is the lovely old King's Castle, the beautiful cathedral where most of the Polish kings lie buried, the Cloth Hall, the old university, the quaint old city gates,



The fine statue of John Sobieski in Warsaw.

A R C T I C O C E A N



the many old churches and houses that saw the rise and fall of Poland, its darkest and its greatest days. It is a most picturesque place, full of gay colors. Some of the old buildings are of red brick, with bright green copper roofs. On a market day the main streets and the big market square are full of peasant women dressed in their picturesque national costume. If the day is fine the town looks one blaze of color. The market place is the centre of the town. Here, in the days of old, the kings of Poland received the homage of the people. The place is surrounded by old palaces and houses, with wide arched entrances and beautiful courtyards.

Among other Polish towns is Poznan, the capital of what was German Poland. Its quaint old town hall, with its slender tower rising two hundred feet and dominating the city, is a striking contrast to the heavy massiveness of such later buildings as the German Kaiser's palace, a big castle, used by the Germans for their Colonization Office.

WARSAW AS THE CENTRE OF TRADE BETWEEN EAST AND WEST

Then there are Lemberg, the town that suffered most during the war; pretty Vilna in the north; and Warsaw, the capital, standing right in the middle of Poland, on the banks of the river Vistula. Since the Middle Ages this city has been a centre of trade between the East and West. Its great navigable river connects it with the sea, and it was for centuries used as the chief route for Polish exports. Unhappily all the old bridges over the river were destroyed during the war, and only temporary bridges have been built since; but in spite of that the view of the river is still very attractive. In summer steamers and big cargo boats can be seen there going down to Danzig, or small boats coming up from Pulawy and Sandomierz bringing loads of fine ripe fruit for the market. The city rises on slopes along the west bank of the Vistula, about 150 feet above the water-level.

THE SPLENDID HOUSES OF THE MERCHANT PRINCES OF OLD

The towering red roofs of the old houses, with clusters of green trees between, make a very beautiful picture. The Old Town is the most fascinating part of the city. Most of its houses were the homes of rich burghers and merchant princes centuries ago. They

have their special names and their coats of arms. There is the House of the Ships, the House of the Lions, the House of the Negro and so on. The doors of many of them show very fine antique work in wrought iron, bronze and wood. Some of the old streets are extremely narrow. They hold under their pavements many a secret passage which made a good hiding-place in the times of Russian persecution. Close to the Old Town stand an ancient castle and the fine Gothic Cathedral of St. John, built in the fourteenth century. One of the gems of Warsaw is her park.

In the middle stands the old Royal Summer Theatre, an open amphitheatre with a stage built of marble in the fashion of a ruined temple. The stage itself is on an island, and a narrow stream of water inclosed in marble embankments separates it from the amphitheatre. The Polish State Theatre in Warsaw is the centre of a whole theatre-system, comprising six theatres, a dramatic school, a school of the ballet, two orchestras and two choruses. The feeling for art is very strong in the Poles, for they are great lovers of beauty. In temperament they are highly strung, sensitive and very quick in grasping new ideas; but the quality they often lack is perseverance in material undertakings. Their business ability has never been strong, though the nation is making a determined effort to acquire it.

THE END OF POLAND'S AGE-LONG STRUGGLE FOR FREEDOM

The whole country is now hard at work. The number of unemployed has been reduced from two millions in 1919 to a few thousand. The Pole of to-day has no time to waste. He knows that every wasted hour means loss to the new reviving Poland; and, after all, Poland is the biggest thing in his life. People say that the more we suffer for a cause the more we love it, and surely no nation has suffered more than the Poles for the love of their homeland. All through the past ages of history they were struggling, shielding Europe from barbarism. At last they became the prey of their despotic neighbors, yet still they struggled against their oppressors till justice was done. And now they are struggling again, this time to bring to their country final peace and prosperity.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 4797.

The Book of CANADA



Photo, courtesy Canadian Silver Fox Breeders' Association.
The beautiful Silver Fox.

FUR-FARMING IN CANADA

WHEN men first enter a new country they kill every fur-bearing animal they come across, and make as much money as they can in the shortest possible time. Soon, when authority is established, it is realized that such methods will destroy whole species, and so regulation is introduced. In the British part of Africa a license is required to shoot an elephant, while if you go to fish for bass in the Muskoka Lakes, you will find that you are not allowed to catch more than eight in any one day, and that each fish must be above a certain size. However, regulation in the case of fur-bearing animals is found not to insure a sufficient supply. Everyone who can pay for fur wishes to have a fur coat, and so fur-bearing animals are now coming to be reared in Canada just like sheep or goats.

The species of fur-bearing animals which are at present being raised in Canada include the fox, mink, skunk, raccoon, fisher and marten. Of these the fox is so much more extensively raised that fur-farming in Canada may almost be said to consist of the breeding of the silver fox.

The silver fox is the black or, rather, the blackish, form of the common red fox, and these dark-colored pups are produced in the same litter as red pups. The terms silver and black, as applied to foxes, are often used care-

lessly, though, as a matter of fact, there are three distinct types of this phase—silver, silver-black and black. A silver fox is silvery all over except on the neck, dark below, and white only on the tip of the tail. A silver-black fox is black all over except the hips and forehead, which have silvery hairs, and the white tip of the tail. A black fox is black all over except the tip of the tail. A cross fox is red on the sides, neck and ears, and silvery on the shoulders and back.

HISTORY OF THE INDUSTRY

The first attempt at raising silver foxes of which we have any authentic record was that of Benjamin Heywood, of Tignish, Prince Edward Island, who about 1872 obtained several litters from foxes kept in captivity. This attempt was a failure because the necessity for seclusion was not realized and the young were destroyed by their parents. Prior to 1890 several fox-farming projects were undertaken, but the industry was first placed on a commercial basis in 1895 by Charles Dalton, of Tignish, and Robert Oulton, of Alberton, Prince Edward Island, who first made use of the modern method of large wire-netting inclosures. Between this date and 1907 several others took up fox-farming, and from this latter date until 1912 steady progress was made, and the

breeders made a good income by the sale of pelts or skins, from some of which were realized \$1,500 to \$2,600 each.

As soon as reports of the success of these breeders became known general interest was aroused, and the boom in fox-farming began. This boom flourished in Prince Edward Island and in north-eastern New Brunswick, and speculation ran rife. Companies were formed, prospectuses setting forth the huge profits which could be quickly made were spread broadcast, and a large amount of money was soon invested in the industry. As a consequence, the price of breeding stock soared, until in 1913 a pair of first-class silver foxes cost \$25,000. Those who already owned foxes, and understood the methods of breeding and caring for the animals, could sell their stock at the high prices then prevailing, and became wealthy; but the new-comers, as usual, lost money. Due partly to these losses and to the outbreak of the World War, the boom broke and only well-managed concerns survived.

During the period of the war most of the companies sold only sufficient of their yield to pay for extensions and to meet current expenses, so that the time from 1914 to 1920 was a period of reconstruction in the industry. In 1920 the Department of Agriculture granted a charter to the Canadian Silver Fox Breeders' Association, with headquarters at Summerside, Prince Edward Island. This association recognizes the pedigrees of ranch-bred silver foxes complying with the regulations of the association, and pedigree certificates are issued by the National Live-stock Records at Ottawa.

LAWS OF HEREDITY AND THEIR APPLICATION TO FOX-BREEDING

It has been mentioned that the silver fox is a "sport" of the common red fox. Investigation has shown that the color phases of this species follow Mendel's law in their mode of hereditary transmission. The main features of this law are that every organism can be regarded, from the standpoint of heredity, as being made up of unit characters, which are usually in pairs (for example, black and red in color, large and small in size), and that one of these characters is dominant and the other is recessive (that is, it is cloaked by the dominant character if the latter is present). It has been found that in foxes red is dominant and

silver is recessive. Hence, if a red and a silver fox are crossed, the young from this cross will be red in appearance. They will not, however, be really pure red foxes, as they will carry the silver as a recessive character which is cloaked by the dominant red. When two of these red-colored offspring are crossed, their progeny will be red and silver, in the proportion of three red to one silver. The one silver pup will be pure silver, and two such animals when crossed will produce nothing but pure silver progeny. In the early days of the industry, before the application of Mendel's law became apparent, many red foxes carrying recessive silver were destroyed because the silver character was not evident. Now such animals are bred to a pure silver fox, and the result is that one-half the progeny will be pure silver.

After good foxes have been bought, the ranch has to be properly situated. A good location is in a wooded area, dry and well drained, where the snow does not pile up in high drifts in winter. While the surface soil should be light and porous, it should have a "hard-pan" subsoil, as this prevents the foxes from burrowing deeply and escaping.

KEEPING THE FOXES IN AND PEOPLE OUT

One of the chief problems which the fox-breeder has to consider in the building of his ranch is how to keep his foxes in and thieves and sight-seers out. This problem is usually met by surrounding the ranch with a very high board fence with only one gate, and with the owner's or keeper's house situated at this gate, and by keeping watchdogs.

The high exterior fence not only keeps people out, but it retains a fox which may have escaped from its pen. In order to do this more efficiently there is often an overhang of wire netting at the top of the fence and a carpet wire about three feet wide laid on the ground inside the fence, to prevent an escaped fox from burrowing out.

THE CONSTRUCTION OF THE PENS AND KENNEL

The pens are constructed of wire netting and most fox-farmers prefer pens thirty feet square. It is essential that the pens be large enough for the foxes to run freely and obtain plenty of exercise, as otherwise their condition suffers. The wire netting which forms the walls

FOX-FARMING EAST AND WEST



A FOX FARM IN PRINCE EDWARD ISLAND



A FINE YOUNG SILVER FOX



A WESTERN FOX FARM NEAR REGINA

of the pen has usually an overhang about two feet wide, which is necessary because, when they become excited, foxes frequently climb the netting. Some ranchers place a strip of sheet-iron three feet wide on the wall at about four feet from the ground, which prevents the fox from climbing high enough to injure itself.

The kennel is usually placed in the centre of the pen, and is generally a wooden structure consisting of two compartments placed on skids a foot or so off the ground, so that the foxes cannot burrow under it and hide. The inner compartment of the kennel has double walls, with the space between filled with some non-conducting material, such as sawdust, and is provided with a bedding of dry leaves or grass.

EXCITEMENT OF THE FOXES MUST BE AVOIDED

The silver fox is at best only a semi-domesticated animal, and is easily alarmed, and for this reason one of the most important elements in successful fox-farming is to see that the animals do not become unduly excited, especially in the breeding season. This is why visitors are not encouraged at any time, and are rigidly excluded at the season when the pups are born, as at this time all unusual sights, sounds and smells are to be avoided. Even the keeper must move quietly and cautiously about the pens, and should, especially in the breeding season, wear the same clothing from day to day. Many fox farms have a tall tower from the upper chamber of which the keeper can overlook all the pens and thus keep watch on his charges.

Some female foxes are prone to become unduly excited when they have young pups, and carry them about from place to place, thus sometimes causing the death of the family from exposure. In such cases the placing of a live chicken or rabbit in the pen is often successful in attracting the mother's attention long enough to allow her condition of nervous excitement to pass.

Foxes mate when ten months old. Only one litter per year is produced, the young being born from the middle of March to the end of May.

THE FEEDING OF THE FOXES, AND THEIR DISEASES

Different fox-farmers use different methods of feeding. Horse-meat, butcher's scraps, fresh fish, salt fish, rabbits,

ground hogs, chickens, mice, biscuits, bread, vegetables, grass, porridge, berries, apples, milk and eggs are all used. The flesh diet is usually fed raw, though some ranchers parboil it. The amount of meat fed should not be more than about a quarter of a pound a day, and this amount should be reduced if any of it is seen to be buried. Bone and lime-water are fed to the young to supply salts for bone-formation.

The fox in the wild state is known to be subject to certain diseases and to be infected by certain parasites, both internal and external. Where numbers of the animals are brought together and confined within rather narrow limits, as they are on a ranch, there is far greater danger of the development and spread of disease than when the animals can roam over a considerable area. The chief diseases which have caused trouble among foxes on ranches are distemper and "big head" (a bacterial tooth infection of young foxes); and the internal parasites to which they are most subject are roundworms, hookworms and lungworms. The chief external parasites are a mite, which causes mange, and fleas, which, because of the irritation they produce, spoil the condition of the fox.

Sanitation consists chiefly in keeping everything about the ranch as clean as possible, so that the pens do not become fouled, and in isolating diseased or infected animals.

MINK-FARMING AND SKUNK-FARMING

While mink-farming is still in the experimental stage, it has been shown that mink can be kept in captivity and the young raised successfully. Three plans of mink-farming have been tried, and these may be called the natural plan, the colony plan and the pen system.

Skunk-farming is likewise in the experimental stage. It has been found that skunks can be reared successfully, that they are far more docile than most fur-bearing animals, and, contrary to what one might suppose, they are not objectionable by reason of their odor.

Some experimental work has been done in the raising of the fisher, marten and otter. Of these animals the otter seems to be particularly well adapted to domestication, as it thrives well in confinement and readily becomes tame. The raccoon has also been bred in captivity.

VALUABLE FUR-BEARING ANIMALS



A Fisher is one of the chief fur-bearing animals in many parts of Canada.



A Beaver felling a tree.



An Otter on a log.



A Badger has a very useful fur.

AGAINST THEIR NATURAL BACKGROUND



A N Opossum.



A Skunk.



Photo, L. W. Brownell

A Raccoon.



A Marten.



Photo, Brown Bros.

A Gray Squirrel.



A Nymph of the Seine, by Jean Goujon.

FRANCE AND HER NEIGHBORS

WE know that in Italy sculpture and painting grew side by side, arose from the same need and impulse—the enriching of churches and public buildings. Flanders rivaled and sometimes outshone Italy in the realm of painting, but she was left far behind in sculpture, for she had no master sculptor who could compare with her painters, the Van Eycks. In Italy there seemed to be for some hundred years an overpowering desire to see glorious solid form as well as glorious color. It might be said that the main strength of European sculpture was concentrated in those generations, and since that time the world has merely shared what force was left.

Here we are speaking of “free” sculpture, of portraiture. Of the lovely carvings that adorn the medieval cathedrals of Europe, and are inseparable from architectural form, we shall be thinking later. By slow degrees the art of the sculptor in France and Flanders grew out of architectural decoration, reliefs, figures on tombs, into portrait sculpture pure and simple. Holland and Spain, each the home of a brilliant school of painting, produced no sculpture worth mentioning, unless Claus Sluter be claimed by the Dutch; more generally he is spoken of as Flemish. In Germany the fifteenth

CONTINUED FROM 4616



and sixteenth centuries produced some particularly fine woodcarving.

It is probable that the artist-workmen of that country loved woodcarving and its possibilities more than any other

European people before or since. There is something in wood itself, as a medium, that dictates to the man carving it, especially if he be of the slow, impassive nature of the Teuton. The Italians, working on marble—which seems more impersonal than wood—and moved by a swifter intelligence, were never held in thrall by their own handiwork as the Germans were.

There is some lovely woodcarving in the Cluny Museum, Paris, which shows what was the temper of the German artists, and a fine selection in the Nuremberg Museum. The best known of the very many woodcarvers were J. Syrlin, of Ulm, the pretty old town of painted houses, and Veit Stoss, who worked at Nuremberg. In the Church of St. Laurence, Nuremberg, is some beautiful carving by Stoss, and among other pieces a lovely St. Barbara by Riemenschneider, a sculptor of Wurzburg. Adam Krafft is generally acknowledged as the most powerful stone-carver in Germany at this time; he died at the beginning of the sixteenth century. His work, which

is realistic and convincing, had much effect on the artists of his day.

THE BEAUTIFUL STATUES IN BRONZE THAT PETER VISCHER MADE

There was also a good deal of bronze statuary produced in Germany about the time the stone- and wood-carvers were working. Peter Vischer was probably the best among the sculptors in bronze. His famous statue of King Arthur in a church at Innsbruck, and the tomb of St. Sebald in the church of that name in Nuremberg, are very fair examples of his work.

Looking on Europe as a whole, the most interesting sculpture, next to that of Italy, was produced in France and Flanders. The end of the fourteenth century saw Claus Sluter working in the neighborhood of Dijon. Sluter was a very gifted artist, much of whose work in the monastery of Champmol has been preserved.

One of the most remarkable things in Europe is the carving Sluter did for the Well of Moses, a six-sided base for a Calvary in the courtyard of the monastery. The sculpture has suffered during the passing of the centuries, but the fine spirit that animated it still lives in the six figures of the prophets. Sluter and the sculptors who followed him carved fine tombs of the dukes of Burgundy for the monastery church. A great wealth of beauty and expression was spent on tombs of the kings and nobles of France. In many cases the sculptors, French and Flemish, are unknown. The famous tomb of Philippe Pot is preserved in the Louvre; those of Philippe le Hardi and Jean san Peur are in the Dijon Museum. The art of the "imagier," a class of sculptors peculiar to the art of the period, is very well explained in the work of Claus Sluter and the sculptors of these tombs.

FRENCH SCULPTURE IN THE STYLE OF THE ITALIAN RENAISSANCE

To sixteenth-century France belong a group of sculptors in whose work was the echo of the Italian Renaissance. The chief were Michel Colombe, Jean Goujon, Germain Pilon and Barthelémy Prieur.

Of these Goujon is to be remembered as the most gifted. He had great skill of technique, and developed the elegant and refined style characteristic of his age. Some of his work is in the lovely little Cluny Museum in Paris, some in

the Louvre; the most famous is the finely sculptured Fountain of the Innocents in Paris, which is decorated with graceful figures of fountain nymphs.

But before 1520, the year of Goujon's birth, Michel Colombe, a sculptor of Tours, had done distinguished work in the Italian Renaissance manner. He is held in memory for a relief of St. George and the Dragon, now in the Louvre, and for the tomb of Francis II of Brittany, which he designed in partnership with another sculptor, Perréal. At the corner of the tomb are four large allegorical statues of Prudence, Strength, Temperance and Justice. The figures are French in style, though the base keeps to Italian characteristics.

Hundreds of minor sculptors were at work at this time, and many names have been lost. It was a period of free decoration in sculpture wherever possible—in churches, public buildings and private houses. Each generation saw more wonderfully carved tombs for nobles, and everyday people who had not much money found money enough to pay a sculptor for a little image of a saint.

SCULPTURE GROUPS OF SCENES IN THE LIFE OF JESUS

There was a tendency to make groups showing the last hours of Jesus. In almost every church one could be seen. The most famous is in Solesmes Abbey, by Ligier-Richier, a sculptor of Touraine. This artist, who made so many sad figures in carving the story of the entombment of Jesus, could also draw children delightfully. There is in the Louvre a little figure of his showing a happy-faced child curling its toes on the ground.

About the beginning of the seventeenth century, in the reign of Henry of Navarre, portrait sculpture became a definite branch of art in France. Before the days of Henry there had been busts of various monarchs, but the example set by him took hold of the French court, and royal portraits in marble, in faint imitation of the busts of Roman emperors, were made by all sculptors. Some were very good, some merely flattering. The equestrian portrait of Henry on the Pont Neuf in Paris is loved for Henry's sake more than for any merit of the sculptor. Simon Guillain, who also carved wonderful tombs, made an excellent full-length portrait statue of Louis XIII. François Girardon was a sculptor of the reign of

EARLY SCULPTURES IN FRANCE



A Prophet, in stone,
twelfth century.



Virgin and Child,
fourteenth century.



Virgin and Child (detail),
in marble, fourteenth century.



A King seated on a throne of Romanesque design,
first half of thirteenth century.



The Virgin, the Child and St. John, in alabaster,
attributed to Germain Pilon.

Louis XIV. He and the group of which he was leader are best represented at Versailles.

Sculpture during the long reign of Louis XIV was, like the painting, held in subjection to the king's idea. We have read of this already. Pictures and statuary alike grew more Italian in character, and the best work in both was done in portraiture. A great deal of the decorative sculpture of the reign was uninspired, and now seems wearisome.

The best sculptor of the period, Pierre

angelo and of Bernini. His work was rugged and powerful, and reflected the life of a man who lived alone, entirely devoted to a lofty ideal of art. The figures in his groups are never still; they are struggling with some weight, bearing some burden, borne onward or backward by some mighty power. The Louvre has a fine relief of Diogenes and Alexander by Puget, and also a figure called the Gallic Hercules. The doorway of Toulon Town Hall was decorated by Puget; huge sculptured figures on either side bear on



The Shrine of St. Sebald,
by Peter Vischer.



The Well of Moses in the Monastery of
Champmol, by Claus Sluter.

Puget, contrived to keep himself aloof from Versailles, where all the art of France was concentrated in making the king's palace and park glorious. Puget lived from 1622 to 1694. Colbert, the great minister of the time, kept the artist in Toulon for a considerable period carving lovely figures on the prows of the royal vessels. One wonderful group of statuary, called the Milo of Crotona, Puget carved for the park of Versailles. It was a powerful throbbing figure, seeming strange among the smooth serenities of Versailles, and made the smiling gods and goddesses which adorned the royal gardens appear still less worthy.

Puget was a worshiper of Michel-

their shoulders the weight of the balcony. These Caryatids suffer from exaggeration of Michelangelo's manner.

Most of the important sculptors of France were drawn into the king's service. Girardon, Antoine Coysevox, and his pupils, Nicolas and Guillaume Coustou and Robert le Lorrain were chief among them. But they were not always busy chiseling nymphs for grottoes in Versailles. They found means of achieving a wider distinction. Guillaume Coustou hewed the famous Horses of Marly, in the Place de la Concorde, Paris, and among other fine groups, The Rhone, in Lyons Town Hall, and Maria Leczinska, in the Louvre. Nicolas Coustou carved

the beautiful Dauphin's tomb in Sens Cathedral. In the church of the Sorbonne, Paris, is the tomb of Richelieu by Girardon; in the Louvre is Mazarin's tomb by Coysevox, who also made some of the best portrait statues and busts of the period. That of the great Condé—the general of the seventeenth century—is a very fine piece of work indeed.

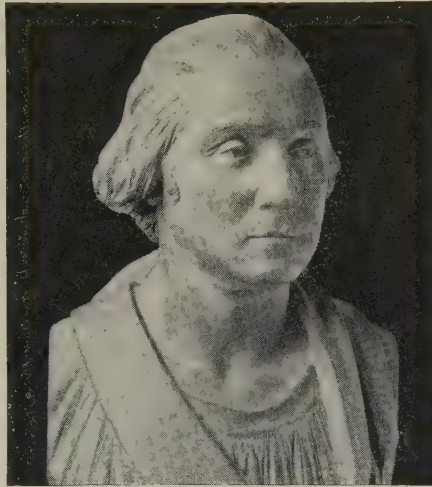
The eighteenth century brought a development and a change. The Italian art favored by Louis XIV died out very soon after his death. We know from our reading of earlier chapters how France drew a long breath when the tyrant of art and letters died. A new painting and a new sculpture sprang suddenly up like flowers which had been hiding and waiting for the first spring sunshine. A little of the classic spirit survived; for a time large monuments, pretentious imitations of Italian groups, were made. The spirit of Coysevox and the Coustous lived on in the sculpture of a few men like Jean Baptiste Lemoyne, Etienne Maurice and Falconet. Edmé Bouchardon, another sculptor, was the very opposite of these in his smooth, cold, correct and graceful style of work.

A little later came two really great sculptors—Jean Baptiste Pigalle (1714-85) and Jean Antoine Houdon (1741-1828). Set amid the lofty achievements of these artists was dainty work by a number of men we might call drawing-room sculptors. The most important was Claude Michel Clodion.

There was a delightful grace in the best of this domestic sculpture. Many of Clodion's groups remind us a little of Fragonard and Watteau. Augustin Pajou was another sculptor who made sensitive, nervous portrait studies in marble. Clodion and Pajou often worked in terracotta for the sake of the pliability of the medium. Jean Jacques Cafféri made a number of portrait busts that have a pleasing distinction.

Lemoyne, the first of this new group, was the master of Falconet, a young artist of gifts who had a tendency to spoil his work, as a writer has said, by insisting on being sublime. He was given a commission to make a colossal equestrian portrait of Peter the Great, and he went to St. Petersburg determined to produce the most wonderful king on horseback ever seen. Perhaps because his natural bent was for carving graceful nymphs, he made the king on horseback a little too wonderful. The fiery charger is rearing just on the edge of a precipice, and Peter the Great looks like a Roman general born out of due time. But it was a spirited piece of work, and is interesting as one of the last of its kind produced by French sculptors.

The sculpture of Pigalle marks another stage, not only in art, but in the thought of the people. He was a nervous, sensitive artist, capable of delicate workmanship, as may be seen in his figure of Mercury attaching wings to his feet. He also made excellent portraits. Probably his best-known work is the tomb of Marshal Saxe in Strassburg Cathedral. The Rheims statue of



Benjamin Franklin, by Jean Antoine Houdon.

Louis XV shows much of his power, independence and individual thought.

He had the courage to throw aside convention when he made this statue group of the French king, for he set at the foot of the pedestal a real French workman and a real French citizen, instead of classical figures to represent labor, or trade.

Close on the heels of Pigalle came Houdon, who threw aside allegorical and classical convention altogether and tried to make his statues full of life and intelligence. He was a realist, one who tried to follow nature, though compared with the realism of to-day, Houdon has the grace and dignity of an age-old art. To his pupils he said: "*Copiez, copiez toujours, et surtout copiez juste*" ("Copy, always copy, and above all copy exactly").

Houdon's chief work was portraiture, but single figures like the Dianas in the Louvre, and *The Winter* in Montpellier Museum, show how varied was the genius of this man. His busts of Louise Brogniard and the lovely smiling head of his wife (both in the Louvre) reveal the softest of womanly graces. Houdon's Voltaire, in the Théâtre Français, is a portrait of another kind; history and life, thought and cynicism are the forces that lie behind this magnificent statue. The portraits of Diderot, Rousseau and Mira-

that the new grandeur of Napoleon replaced the old grandeur of Louis XIV. The work done for him suffered from being too grand, and the artists could not get away from the spell of classic art. When Antoine Chaudet carved his portrait of Napoleon he put a toga on him as if he had been a Cæsar. Canova, the Italian sculptor, did worse: his statue of Napoleon is as undraped as if he were a Greek god. And the satellites of Napoleon, his generals on whom renown was so freely shed, were sculptured



THE BURGHEERS OF CALAIS—A SCULPTURE GROUP BY AUGUSTE RODIN

beau are superb. They are so intensely real that we feel they could have belonged to no other people and no other period than the French on the eve of the Revolution.

The Revolution caught Houdon up in middle life, so that his work belongs to the two epochs of thought. His bust of Napoleon, in the Dijon Museum, shows how the sculptor had pursued his art untroubled by the upheaval of a great nation.

After the Revolution the feeling about sculpture in France slowly changed. For a time there was little difference, save

in the flowing garments of ancient Rome. So slow was French sculpture in throwing off the leading-strings of her mother Greece and her nurse Italy.

But as a generation or two passed by, France as a republic claimed the glory which had belonged to France as a monarchy. The mass of the people now became of immense importance.

So far the great part of French sculpture had been concerned with religion, mythology, and portraits of kings and of those whom kings delighted to honor. Emperors now faded into the background, and the laurels were given to statesmen,

FROM HOUDON'S DAY TO OURS



Louise Brogniart,
by Houdon.



Pierre Puvis de Chavannes,
by Rodin.



Study for La Danse,
by Carpeaux.



The Creation of Man,
by Rodin.



Theseus and the Centaur Bianor,
by Barye.



The Age of Bronze,
by Rodin.



The wonderful Tomb of Death in Père-Lachaise Cemetery, Paris,
by Paul Albert Bartholomé.

historians, scientists and inventors. The best sculpture was devoted to such portraiture and to the decoration of public buildings.

Three or four names dominate nineteenth-century sculpture in France: Barye, Rude, Carpeaux, Rodin. Behind these came a great company of lesser men who did much that was praiseworthy without being epoch-making. Men like David d'Angers, Jehan du Seigneur, Chaudet, Dubois, Mercié, Pradier, Falguière, Frémiet, Dalou, Bartholomé, Injalbert and Cordonnier—the last of these belonging to our own day as well as to yesterday.

Bartholomé carved, among other things, the grand Monument to the Dead in Père-Lachaise, Paris. Four fine bronzes by Paul Dubois decorate General Lamoricière's tomb in Nantes Cathedral. Dalou made a superb group called The Triumph of the Republic, in the Place de la Nation, Paris, and the monument to Delacroix in the Luxembourg Gardens. Most of these later sculptors of France are represented in the Luxembourg Galleries.

D'Angers, a little earlier, made portrait studies in great numbers and also made sculptures for the pediment of the Pantheon.

Rude, his work similarly divided, has earned an immortality by his superb group called The Marseillaise, on the Arc de Triomphe. Two other very fine works of his are Napoleon Awaking to Immortality, in the Louvre, and the tomb of General Cavaignac, in Montmartre Cemetery, Paris.

THE HAPPY FIGURES THAT DANCE ABOVE THE STREETS OF PARIS

All the work of Rude was marked by that quivering lifelikeness which is the mark of great sculpture. He alone would have glorified a century. Carpeaux carried on in his work something of Rude's spirit. His famous Dancing Group—a decoration of the Opera House in Paris—is a mass of alert and dainty figures who smile and sing as they dance up there, set in marble forever. Carpeaux and Frémiet collaborated in a remarkable work—the Fountain of the Four Quarters of the World, in the Observatory Gardens, Paris.

Among these carvers of the beauty of the human form stands out another, the only great sculptor of animals France has

produced—Barye. Barye's work came as a revelation to French artists. Never before had such crouching, springing, powerful forms invaded her statuary. Barye has been called the "Michelangelo of wild beasts." Three of his most famous bronzes are in the Louvre: the Centaur, the Tiger and Crocodile, and the Elephant. Frémiet's work in animals is also very wonderful. There is extraordinary force in his group Orang-outang and Savage, in Borneo.

THE POOR BOY WHO WON FAME AND BROUGHT GLORY TO FRANCE

Auguste Rodin, born in 1840, was a poor boy of Paris who became the glory of France. A poet, a thinker, a dreamer in stone, he was also a strange realist. He has had a tremendous effect on the artists of his generation. His work was a fitting close to the nineteenth century, and stretches out to the twentieth in full kinship with those whose work belongs more properly to to-morrow. Those who look thoughtfully at Rodin's work can see in it a handbook on the advance of sculpture. Rodin translated woods, color, temper, into stone; his predecessors had been content with form and the illusion of actual life. Like most revolutionaries, Rodin was not accepted at first, and his work was severely criticized. His habit of producing what seemed to many unfinished work brought him to great disfavor among those who were unable to see that the unfinished figure sleeping in stone sometimes had a quality that no smooth, carefully finished limbs could have. But when he died, in 1917, he was accepted by Europe as a genius.

Examples of Rodin's work are to be seen now in all parts of the world. They cover a wide range of subject and expression, from busts and figures that are almost too delicate and pretty to such groups as the Six Citizens of Calais, and the massive form of his Thinker.

Of a pupil and co-worker of his, Rodin said: "Impetuosity is the characteristic of the talent of Bourdelle." This Emile-Antoine Bourdelle, whose craftsmanship is masterly and whose modeling broad and bold, has something worth while to express. He presents his ideas in a style simple and unconventional, with an effect of austere beauty. Like his master, he is a force making for new life in the field of sculpture.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 4853.

The Book of MEN AND WOMEN



B. Leigh Smith.



Dr. S. A. Andr e.



Sir George Nares.



Elisha Kent Kane.



Sir E. A. Inglefield.



Major F. G. Jackson.

THE NORTH POLE MEN

WE may hear boys and girls proudly asserting to-day that they are old enough for the South Pole to have been discovered in their time, only to be put down by somebody two years older with the severe retort: "But *both* Poles have been found since I was born!"

What centuries of brave endeavor have yielded a double harvest in the lifetime of our boys and girls. Four hundred years of bitter striving, of suffering untold, of hardship beyond description; then, in just over two years, the frozen ends of the earth are reached, once in the North, twice in the South.

It might seem as if nature, terrible and savage in these untrodden ways of the earth, had suddenly relented and admitted men with grace and kindness into her cold white realms of silence. But no; she was merciless to the last; for one of the men who reached the South Pole died in that bleak land.

The adventurers who set out to find the Poles all went voluntarily to their doom, knowing the possible cost. They did not expect to die by the way, but the chance is one of the greatest a man can take. Captains and comrades staked their all on it, and where they failed they failed gloriously.

How could they nerve themselves to the terrors of such a quest? They

CONTINUED FROM 4591



knew, much better than we, the full story of the sufferings and disappointments of the men who went before them into the great South Sea or into the Arctic with its nerve-racking winter night.

The stern truth of the risks to be run, the sufferings to be endured, the likelihood of starvation, disease, and the slow agony of life ebbing inch by inch, were all foreseen. There was, after all, no short cut to the romance and riches of the East, no sea passage from the Atlantic to the Pacific except one which took two years to travel.

From the first adventurer to the last, they have all tried to admit us to their feelings about searching for the Poles. None of them has succeeded better than a Viking, who wrote six centuries ago of his countrymen of an earlier age.

If you wish to know (wrote this Norseman) what men seek in this land, or why men journey thither in so great danger of their lives, then it is the threefold nature of man which draws him thither.

One part of him is emulation and desire of fame, for it is man's nature to go where there is likelihood of great danger, and to make himself famous thereby. Another part is the desire of knowledge, for it is in man's nature to wish to know and see those parts of which he has heard, and to find out whether they are as told or not. The third part is the desire of gain, seeing that men seek after riches in every place where they learn that profit is to be had, even though there be great danger in it.



CAESAR.

SPENCER.



But a money reward was never, even in the earlier stages of the struggle for the Poles, a serious factor. There is a grim Viking jest still on the map to tell the tale of cheerful deceits to coax men toward these frozen wilds in the brave days of old. When the Icelander Gunnbiorn was carried away by a gale into sight of a great white land, sheeted with snow, he named the place White Shirt Land. Eric the Red came later to the same scene.

**THE NAME THAT WAS TO BRING
PEOPLE TO GREENLAND**

"What shall we call this land?" his men asked him.

"Call it Green Land," said he.

"But it is not a green land," said they.

"It matters not," quoth Eric; "give it a good name and people will come to it."

And that is why the land of the icy mountains received its name.

It was no such trick that beguiled the polar men to the North, for they knew the story. Equally idle was Martin Frobisher's tale of mountains of gold. "If what you say about Frobisher be true," wrote Hubert Languet to Sir Philip Sidney, "you have stumbled on that gift of nature which is, of all, the most fatal and baneful to mankind, yet which most men so madly covet. I fear that England, crazed by the love of gold, will now empty herself into these islands that Frobisher has discovered."

The gold was worthless ore which we now call "fool's gold." Frobisher's supposed continents of Asia and America were the shores of the bay which bears his name, and all the story was known to the men who followed after.

We have covered a part of the Arctic explorations already. Now we must press on to our goal, the track marked for us by Sir John Ross, his nephew James Clark Ross, and the indomitable William Edward Parry. We pass the scene of the bitter tragedy of Sir John Franklin and all his men, and see the crowning of his life-bought victory in the discovery of the Northeast Passage by Adolf Eric Nordenskiöld, and the Northwest Passage by Roald Amundsen.

**THE DISCOVERIES OF THE MEN WHO
SEARCHED FOR SIR JOHN FRANKLIN**

All this time men were battering at the ramparts of the Pole itself, the attacks proceeding from many countries, from the Old World and the New. Much that was done had the search for the bodies of

Franklin and his crews as the real object, but accident or design opened the way more and more to the secret door. Thus, Sir Edward Augustus Inglefield, in 1852, found no Franklin traces, but he did find Cape Sabine and Ellesmere Island, which he named. He achieved the farthest north up to his time.

A year later Elisha Kent Kane, born in Philadelphia in 1820, sailed as surgeon in an expedition fitted out by Henry Grinnell of New York. Kane was by profession a doctor and by every instinct a true rover. A following expedition was under his personal control, and produced notable results, the fruit of appalling hardships.

**THE SPLENDID ESKIMOS WHO LED
THE WHITE MEN TO THEIR GOAL**

The Eskimos knew nothing of the Pole, little, indeed, of anything beyond the art of living in barely supportable conditions; yet they were the ultimate guides for white men to the desired goal. Kane was the first man systematically to seek their aid and profit by it. There was a tremendous figure in his travels, Hans Hendrik of Greenland, a nineteen-year-old native of ability and charming faithfulness. He could grapple with a bear and spear a bird on the wing. There was old Kalutunah, chief of the Etah Eskimos, whose descendants Peary was to meet. Kalutunah had the dignity, grace and courtesy which we ascribe to the Indians. He was a lion in the chase, a master of craft with the snare, and one of nature's gentlemen in his relations with friendless strangers.

Between them they taught Kane's men to hunt the bear and to fill their larder with wild birds. The birds were the little auks, with which the Arctic air teems at times. The method was to make a little net of sealskin, mounted on a ten-foot pole, then to crouch behind the brow of a hill over which the birds would fly in from sea, then to raise the net and catch them like butterflies, a score at a time. Then, taking the birds out one by one, Kalutunah, little king of the wilds, bit each once through the head. In a twinkling he had the net up for another haul, so that over one hundred were ready for the strangers' dinner in the briefest space.

Guided and assisted by Eskimos, Kane made valuable discoveries. He found and named Kane Basin, fought his way

THREE FAMOUS POLAR EXPLORERS



Peary and his dogs crossing an open channel in the ice.



Captain Otto Sverdrup with his dogs on the deck of the Fram.



Dr. Nansen talks of his adventures to school children at Trondhjem.

into Kennedy Channel, and passed several miles north of Inglefield's record. His actual discoveries now seem very small when we look back, though they were important at the time. Kane will always remain famous for his great sledge journey when his ship, poorly provisioned and unfitted for winter work, became fastened in the ice.

THE STORES OF FOOD RAIDED BY THE HUNGRY BEARS

For the sledge journey men were sent on ahead to deposit stores for the later party. They met with serious misfortune, and two perished of cold. When Kane set out he nearly met the fate which later befell Captain Scott, for his supplies ran short.

Bears had easily tossed aside protecting stones which it had taken three men to place in position. The food had been eaten, and barrels of fuel smashed to pieces. Scurvy naturally attended scarcity of food. The doctor himself was a victim, and had to be carried lashed to a sledge, his legs rigid and useless.

In the second summer the ship failed to free herself, so a second winter in the ice had to be faced. There would have been another disaster like that of Franklin's but for the Eskimos. With these Kane made a treaty. They were not to pillage the ship in the absence of the sledging white men, and were to furnish fresh dogs and meat. In exchange the visitors were to help them in hunting and to give them needles, knives and other trifles. Nobly the Eskimos performed their part, and the voyagers were saved from starvation.

But there seemed no prospect of ever freeing the ship, and it became necessary to make a great sledge trip to Beeching Island to obtain help. The details of the final escape are terrible.

Yet when the story was told to the world, the result was to send more and more men flocking North on the same trail. Dr. Hayes, Kane's assistant, carried the torch farther. But he made grave mistakes through inexperience in surveying—a fact due to the death of gallant Sontag, his scientist, who was frozen to death on a sledging trip. Yet his work was productive of useful result and was a beacon which other men followed.

In 1860 Dr. Hayes sailed to the Arctic by way of Baffin Bay, and reached the farthest north up to that time.

AN AMERICAN BLACKSMITH'S FIVE YEARS OF LIFE AMONG ESKIMOS

One of the strangest of his successors was Charles Francis Hall, a Cincinnati blacksmith turned journalist, a native of Rochester, New York. He first had experience of the sea when he set forth as commander of an expedition, in 1860, in search of Franklin. He was away two years. He returned to his search in 1864, when he found some of the bones of the hapless party, and for five years lived among Eskimos, as Stefansson was to do in our own time.

In 1871 he was off again, in command of the American Government steamer *Polaris*, and reached a point 250 miles up Smith Channel, the farthest yet. He died of illness produced by privation and hardship in winter quarters at Thank God Harbor, Greenland, in the November of the year of his departure. The *Polaris* trip was famous for its discoveries, and also for the fact that nineteen of its men went adrift with stores on an ice-floe and cruised from October, 1871, till April of the following year, when at the point of death they were rescued. The *Polaris* never reached home, and the remainder of the crew made a great voyage in open boats through the icy sea, to be picked up finally off Cape York.

THE LITTLE BLACK HOUSE ADRIFT ON THE GREAT ICE-FLOE

Germany sent out the *Germania* and the *Hansa* in 1869. Advances on old lines were made, but the attempt was notable for the loss of the *Hansa*. The ships became separated, and the *Hansa*, caught between two promontories of ice nearly forty miles off Sabine Island, was frozen in. The crew thought their plight was but temporary, but, having a quantity of coal briquettes aboard, took the precaution to build a number of these into a house on the ice. It was only necessary to fill the cracks with powdered snow and pour water on it, and the place was air-tight in ten minutes.

But the *Hansa* was destined never to sail again. The ice-field began to turn and she was lifted up and smashed to pieces. The floe on which the crew were housed, at first two miles in diameter, was at last reduced to 150 feet. Yet on that they lived through the winter, and in the following spring took to their boats and reached safety.

A very similar fate attended the first

DR. NANSEN ON HIS FAMOUS JOURNEY



Dr. Nansen and Lieutenant Johansen leaving the Fram for their great journey.



Dr. Nansen outside Mr. Jackson's hut in Franz Josef Land. The dramatic meeting of Dr. Nansen and Mr. Jackson.

Austrian expedition in 1871, when Lieutenants Carl Weyprecht and Julius Payer steamed up to try a new route toward the Pole, beyond the northeast coast of Nova Zembla. They set out on July 14, and thirty-seven days later were seized by the ice and made prisoners. It was not a matter of being anchored by the forces of nature to a fixed position. For nearly two years they were dragged about the northern ocean whithersoever currents carried the ice-field to which they were attached. On this 300-ton vessel the time passed drearily while land was looked for in vain.

A N EXPLORER'S THRILLING ADVENTURES AND HIS DASH IN SEARCH OF HELP

Never were men more powerless. They saw no land till August 30, 1873, when what we now know as Franz Josef Land burst on their view with the sudden lifting of the fog. Yet so tantalizing was fortune that two months passed before they could land. Terrible experiences befell them when they did. Payer, with two men, dogs and a sledge, set off to explore. A snow bridge collapsing beneath their feet, down went sledge, dogs and one of the men, the whole weight being borne by the rope by which Payer was attached to the vehicle.

"The rope is cutting me in two; I must sever it!" he called to the man below. The sailor begged him not to do so lest it should involve the death of himself and the dogs. But Payer, assured by the other seaman that there was a ledge below the point at which the sledge was resting, did cut the rope. The sledge, with the man and the dogs, spun down another ten feet and came to rest.

"Now keep yourself from freezing for four hours while I fetch help!" shouted Payer, setting off with his other companion to run six miles through deep snow back to the camp.

We boast of our modern Marathon and Olympic runners, but that desperate effort to save life by speed and strength must have been a greater trial. Payer was too fast for his companion. To lighten his burden he stripped off his bearskin clothes, his boots and gloves as he ran, and with only thin stockings sped through the snow and over the cutting ice. But he found his men, and was back with them at the crevasse, and had dogs and man up safe and sound within four and a half hours of their fall.

THE FINE STORY WHICH CAME TO LIGHT AFTER HALF A CENTURY

That did not exhaust Payer's adventures. The end of the sledge journey came, and it was necessary to return to the ship for food and help. All but two of the dogs had been eaten, and these two bore him wearily on ahead of the rest of the party, over perilous ways, over icy slopes and rocky hills. But the ship was nowhere to be seen. It appeared as if the relentless ice had carried her off again. At last, mounting an ice-cliff, Payer caught sight of her, a speck in the distance. He was too feeble to cry to his dogs or make them understand. He seized the head of each in turn in his hands, held it toward the ship and pointed, till he saw their dull eyes gleam and their frost-cracked ears prick up. Then, with no command, no urging, away they went and brought him in safety to the vessel.

That vessel was finally abandoned after two years of cruising at the will of the ice. Payer dropped overboard a record of his adventures and departure from her, and it was found in 1921, nearly half a century later, by Professor Olaf Holte-dahl, of the Danish expedition to Nova Zembla.

TWO NINETEENTH-CENTURY MEN OF THE ELIZABETHAN TYPE

Two other fine names that come into the story at this point are those of Englishmen—James Lamont and Benjamin Leigh Smith—nineteenth-century men of the Elizabethan type, who fitted out yachts and sailed north in quest of sport and knowledge. Lamont was the discoverer of coal in Spitsbergen, where mining is now an important Arctic industry. In three days his men got ten tons of it aboard, its seams and fissures filled with water turned to ice.

Leigh Smith was one of the knights errant of polar effort. He was a man of means, a scholar, barrister and man of action. He went north five times, and upon his first attempt was just in time to rescue a desperate involuntary colony on Spitsbergen. There the chivalrous Nordenskiöld, head of a Swedish expedition of twenty-four men, had found 101 mariners starving amid Spitsbergen ice. He endeavored to feed them through the winter on supplies meant for a fifth that number of mouths. All must have perished had not Smith rescued them.

Smith was the second discoverer of Franz Josef Land, arriving there in his own yacht, the Eira, six years after Payer had left. The Austrian vessel had vanished, but the ice seized another hostage in its place, the newly arrived Eira, which was nipped and smashed and sunk in sixty-six feet of water before the twenty-five officers and crew could do more than erect a tent and snatch a few stores. They wintered in a house made of stones and mud, and supported themselves in the main on the flesh of bears, walrus and birds. Once, with winter still upon

We see how one man's feats and failures led other men to follow, but in tracing the succession of men and events we are likely to turn out of the strict order of progress, owing to the number of the paths men traveled. We must go back to the middle of the nineteenth century, to speak of the work of Sir George Nares, famous, as Franklin had been, for fighting and administrative work, and, besides, for his work as commander of the Challenger expedition. The British Government, when they heard of the success of Hall in the *Polaris*, gave Nares



THE REGIONS ROUND THE NORTH POLE AND THE WAY THE EXPLORERS WENT

them, they had come almost to the end of their resources, when fortune sent eight bears to be converted into food for the hapless seafarers.

It was with sails of tablecloths and shirt-tails that the cheery Leigh Smith eventually got his boats away when summer came. He reached home in safety because a storm blew him out of his course to the position at which had arrived the very ship sent out from home to seek him. We owe to this happy-go-lucky hero much of our knowledge of Arctic deep-sea temperatures and currents, as well as some hundreds of miles of new coast-line within the Arctic Circle.

three little ships and bade him find the Pole.

All the stories of suffering, privation and death which attended these Arctic expeditions were well known about the world at this time, yet what do we find when crews for the Nares 1875 expedition were desired? A naval officer entered the Portsmouth headquarters of the expedition and said: "An order has come on board my ship directing me to send volunteers for Arctic service to this office. Well, what am I to do? The whole ship's company, numbering nearly eight hundred men, have given in their names!" Such was the spirit of the sailors.

AN UNSOLVED MYSTERY OF LIFE IN THE FROZEN NORTH

The expedition did not reach the Pole, but its outposts got to within 399 miles of it, the nearest that man had ever been. The results to geography, geology and natural history were important. Far north, on what we call Washington Irving Island, a cairn was found. It was very ancient, moss-grown, like a relic of some previous creation, yet, as the party were able to say, clearly the work of white men's hands. Who made it? How came it there, symbol of civilized life of a long ago in that little isle of heartbreaking loneliness?

Nares' men found the nest of a sanderling at 82° North, and near at hand were the cradles of knot, a kind of sandpiper, and gray phalarope, a wading bird. There were very old Eskimo relics where no Eskimos have lived for ages, and there was coal, too, to tell of one-time brilliant sunshine and verdure like that of tropical Africa.

No one ever gave us a better idea of the cold and strength of nature's Arctic forces than Nares in this expedition. As winter descended there was a race between his men with their ship and ice-masses for possession of a little sheltered cove. It looked as if the ice would get in first and block the harbor. But the men just won, dragging their craft tail first into safety.

THE MEN WHO LIVED IN AN ICE-LOCKED SANCTUARY

The ice at once sealed the entrance, coasting by in such enormous masses that the fragments broken off in grinding contact with the land weighed 30,000 and more tons apiece. They piled up outside the harbor in blocks 300 feet broad and 50 feet high, and shut the men in under conditions of such cold that the temperature was 105 degrees below the freezing-point. The very pipes the men smoked froze.

The story of the Nares sledging parties is famous but terrible. The work was so hard, the snow so deep, the hummocks so high, that they made but a mile in two hours, with trebled crews hauling at each sledge in turn, and scurvy descending on the party.

Another party that endured frightful suffering was one which set out for Lady Franklin Bay in 1881. Lieutenant A. W. Greely of the United States Army was

in command. He was left with provisions for two years, but it was not until 1884 that relief arrived. Seven men out of the twenty-five original members were found alive.

Let us return once more to Franz Josef Land, which the original discoverers thought to be a vast unbroken mass of land, which Leigh Smith divided into smaller sections, but which yet remained the subject of geographical dispute. To settle the question the late Lord Northcliffe fitted out an expedition, and in 1894 sent out Frederick George Jackson in the *Windward*. The expedition was exceptionally well provided with necessities for making Arctic life comfortable and healthy. Jackson, with his experience of the Australian deserts and the Siberian tundras, was well qualified by training and liking for the task.

He established himself at Cape Flora in a hut which he called Elmwood. There he dwelt a thousand days, traveling far and near, mapping what proved to be a considerable archipelago, and gathering an unsurpassed collection of material for the instruction of Arctic science. Let us leave him there for a moment, that we may return to him in illustrious company.

THE EXPLORER WHO BURNED FOOD TO KEEP AN ENGINE RUNNING

Two expeditions started from the United States in 1879. One, under Lieutenant Frederick Schwatka, discovered the last relics of Franklin. In July, 1879, Lieutenant George Washington de Long left San Francisco in the *Jeannette* to explore, on behalf of the United States Government, certain Siberian islands. Two months later he was fast locked in the ice off Herald Island. He was not daunted, for he had had thrilling Arctic experiences before. Once, in a little ship's steam launch, he carried out a daring search for the lost *Polaris* and her crew, and, his furnace being swamped amid charging icebergs and moving fields of ice, he was in danger of sinking, even if his boat were not smashed. Seas washed over him, flooding the launch and drenching all the fuel. Even the matches were saturated. But if the men were to escape they must raise steam; and raise steam they did. Matches were kept for two hours in contact with the body of a seaman. Then a few shavings were kindled with oil, and De Long burned pork to keep his engine running.

Such was the resource of this commander who became frozen in the Jeannette, off Herald Island, as he named his find, near the New Siberian Islands. For nearly two years the ship was held; then, the ice breaking away and reclosing, she was nipped and split asunder. The crew of thirty-three got away in three boats, and two detachments nearly all survived. But De Long and eleven of his thirteen companions suffered the fate of Franklin and Scott. Two of their party were sent off, after many days of agonized wanderings, to seek relief, which arrived too late.

De Long and all the others were dead, starved to skeletons. They had hardly any clothes. They had burned their tent for fuel. They had lived on a teaspoonful of glycerine a day, then on a little sweet oil and hot water, and were found, with the leader's stiffened arm raised like a guiding post above the snow, their bodies below, frozen hard to the ground. Like Scott, they lay eleven days in their camp of death; like him, they were always near help but too weak to reach it.

THE FAITHFULNESS AND HEROISM OF A CHINESE COOK

No other Arctic tragedy is so well written about as this, for there was the evidence of the survivors and there was the courageous diary of De Long. One of the most stirring things in the tragic story was the fidelity and valor of a little Chinese cook, Ah Sam.

Starvation, misery, toil and terror, and frostbite which took the flesh off his bones, failed to depress his marvelous spirits. He was always bright, always working, always assisting his leader with his burdens, warming him with his own body. And when the corpses were wrenched free of the ice, there was little Ah Sam's body doubled up beneath that of De Long. He had seen his master give Christian burial in a river to members of the crew who had died by the way. And little Ah Sam, the last of all to survive, died in the struggle to bear the dead body of his beloved leader for burial to the river near which they had made their last halt.

The world rang with the sad story of the Jeannette. With the recovery and burial on a mountain-top in Siberia of the unhappy victims, it was thought that the end had come. But there was to be a startling sequel to the grim tragedy.

Three years after the Jeannette sank

off the coast of Siberia bits of her began to appear off the coast of Greenland. Wreckage, clothing, writing arrived in a little stream, having come by current from near Bering Strait in Asia, right across the Polar Sea to Europe. Was there, after all, a short cut across that terrible ocean by way of the Pole itself? It fell to Dr. Fridtjof Nansen, the Norwegian scholar and explorer, to solve the riddle.

DR. NANSEN'S TERRIFIC CHALLENGE TO THE DREADED ICE KING

Born in the capital of Norway in October, 1861, he was at this time already famed for daring and initiative as a voyager in the Arctic, as well as for his learning. To make a long story short, the wonderful little ship Fram (Fram means "onward") was built for him. He set sail in it in July, 1893, not, like other explorers, to battle with the odds, but to take the line of least resistance. He intended to let frost seize his ship and carry it through all its secret ways, whithersoever it would, to whatsoever goal destiny might decide: a terrific challenge to the dreadful Ice King.

Nansen steamed and sailed to the north Asian coast, round Cape Chelyuskin, to the New Siberian Islands. Just north of Sannikof Island he moored the Fram to an ice-floe, which refused to part company with her for the next thirty-five months. Where the ice-field floated, there went the Fram with her, both borne by unknown currents. We cannot follow the details of her windings and twistings, but must content ourselves with the fact that she made the most tremendous advance into the North since the great days of Baffin, reaching 85° North and 66° West, the farthest north ever attained by a ship.

THE WONDERFUL VOYAGE OF THE LITTLE SHIP LOCKED IN AN ICY GRIP

The Fram was in the hands of a very great sailor, Otto Neumann Sverdrup, in whose company it would be pleasant to linger, for he has written his name in letters of enduring record on the Arctic map. He it was who handled the Fram throughout, and after Nansen's departure commanded the expedition on the ship. The Fram, in the third year, turned south and headed, still attached to her captor, toward Spitsbergen. On June 3, 1896, Sverdrup determined to blast a way out into the clear water which he saw ahead. But the ice proved still reluctant, and the

little ship was held and gripped again and again for the next three months, finally breaking free from the ice in August of that year, thirty-five months from her entry into the field.

She raised steam and made for Danes Island in Spitsbergen. Hardly had she cast anchor when the doomed Salomon August Andrée stepped aboard to pay a visit of congratulation. With Dr. Ekholm and Strindberg this Swedish enthusiast was then and there preparing his mad, brave enterprise to fly by balloon to the North Pole. It was from there, soon afterward, that he took the air, never again to be seen by mortal eyes. His fate remains one of the terrible mysteries of the Arctic, though only a dull imagination would fail to guess the facts.

But what of Nansen, whom we set afloat on the *Fram*, which we have permitted to wander with wind and current all this time without him? After his ship had tracked hither and thither, towed by a wandering ice-floe for twenty months, Nansen saw that she would never reach the North Pole in time for provisions for the crew to hold out. So he took with him a brother spirit in Frederick Hjalmar Johansen, and set out with a dog team and a sledge to march to the coveted goal.

THE DEATHLESS STORY OF DR. NANSEN'S MARCH TO THE POLE

Johansen was a university man, born in 1867, who had been in the Norwegian army with commissioned rank, and was so determined to accompany Nansen that, other posts being filled, he went as a stoker.

These two, then, began their great march to the Pole in March, 1895, and for the next fifteen months looked on no human faces but each other's. To their sledge they added Eskimo boats, called kayaks, and in the face of appalling difficulties and perils they achieved wonders. They were constantly menaced by bears; they were attacked in the water by walruses which ripped the bottom of one of the two boats; they fell into crevasses; they were wet; they were frozen; Nansen was crippled by rheumatism. They came so near to starvation that once all they had to sustain them for an entire day was a dreadful meal of dog's blood.

Nevertheless, in three weeks they traveled 150 miles in regions far beyond the farthest point ever previously reached by man. But they did not reach the Pole.

They had to turn back, in anticipation of winter, at a spot 86° 14' North Latitude.

Perhaps the threat of winter would not have turned them back had not the ice ridges been quite impossible for their strength. They turned south for either Spitsbergen or Franz Josef Land, and after a memorable march, which Nansen has splendidly described in his book, they at last left the ice and reached land. But where they were they did not know, for in a terrific thirty-six hours' struggle for safety over the frozen sea they had let their watches run down and could not take correct observations.

THE LONG REST OF THE EXPLORERS THROUGH THE ARCTIC WINTER

They thought they had reached a hitherto undiscovered island, but could not be sure. At any rate, there they had to stay for the winter, in gross darkness and bitter weather. Yet Fate was kind to them, for there was abundance of bears. They lived on bear flesh and fat, and slept so prodigiously that at the end of it all Nansen's weight had increased.

With the coming of spring they resumed their march southwest, with many adventures. Once their two boats floated away without them, and Nansen had to pursue them through the freezing water. He was so cold that soon he could not swim, but had to float on his back to recover. When he at last came up with them he was too frozen to get into them. He managed to make the climb, but he was so feeble that he could not row. He had to kick his way through the water, first with several strokes with one foot, then repeating the operation with the other foot, after balancing himself on the opposite side of the boat.

It was always touch and go with the indomitable pair. They were staring death in the face hour by hour. At last an astounding thing happened. Nansen heard a barking, and he knew that the sound could come only from a domestic dog, for wild dogs do not bark. He went out to explore, leaving Johansen with the tent and sledge among the hummocks.

THE ENGLISHMAN'S VOICE THAT CAME FROM THE GREAT WHITE SILENCE

He saw a distant figure, he heard a voice, and the voice was English. The Englishman saw him. They hailed each other, and, with heads politely bared, approached with a hearty "How do you do?"

THE HARD WAY TO THE POLE



THE NORTH POLE AS PEARY LEFT IT BEFORE RETURNING TO CIVILIZATION
From Admiral Peary's photographs in his book *The North Pole*, published by Hodder and Stoughton.



A TERRIBLE ICE-FIELD WHICH PEARY HAD TO CROSS ON HIS DIFFICULT PATH TO THE POLE

Nansen tells us what followed in a scene as memorable as the meeting of Stanley with Livingstone.

On one side, he says, was the civilized European, in an English overcoat and neat boots and gaiters, well shaved, well groomed, bringing with him a perfume of scented soap perceptible to the wild man's sharpened senses. On the other side was the wild man in dirty rags, black with oil and soot, and with long, uncombed hair and shaggy beard black with smoke. The natural fair complexion of his face could not be seen through the thick layer of fat and soot which a winter's endeavor with warm water, moss, rags, and at last a knife, had tried in vain to remove.

The stranger was Jackson, whom we left some time ago in Franz Josef Land. And Franz Josef Land was still the setting, for it was in one of the islands of this archipelago that Nansen and Johansen had unwittingly passed the winter.

"I'm immensely glad to see you," said Jackson, without the least guessing the identity of the dirty wanderer. He was looking for Nansen, but never dreamed of the identity of the man before him.

THE WELCOME SANCTUARY DR. NANSEN FOUND WITH JACKSON

Nansen knew Jackson, for the two had met in London, and he imagined all this time that Jackson recognized him.

"Have you a ship here?" asked the Englishman.

"No; my ship is not here."

"How many are there of you?"

"I have one companion at the ice edge."

They were walking inland while thus talking. Suddenly Jackson stopped, gazed full into the wild man's face, and asked excitedly, "Aren't you Nansen?"

"Yes, I am."

"By Jove, I *am* glad to see you!"

He made Nansen tell him of the Fram, but judged that the ship was lost and that Nansen and Johansen were the only survivors, so that for hours later, when they reached the hut, no one asked questions concerning what they imagined to be the tragedy of it all.

However, all's well that ends well. The truth came out by accident, and there was such cheering from English lungs as never had the Arctic heard before.

"We've plenty of room for you both," cheerily said Jackson. The "plenty" proved to be a few square feet on the floor

of the hut not already occupied for sleeping by Jackson and his six companions.

The Windward arrived that year with stores, and though Jackson remained to complete his explorations, Nansen and Johansen returned by the ship to civilization and high honor, and the knowledge that the results of his three years' ordeal could be excelled only by the man who actually gained the Pole itself. The next explorer to break the record for the closest approach to the Pole was the Duke of the Abruzzi. In 1900, after a terrible winter, a sledge party came within 240 miles of the goal.

THE EARLY DAYS THAT PAVED THE WAY TO THE TRIUMPH OF PEARY

That goal remained still to be reached—and it was reached, the hero of the achievement being Robert Peary, one of the most dogged and pertinacious heroes of Arctic endeavor that ever penetrated the region of ice and terror. Admiral Robert Edwin Peary was born at Cresson, Pennsylvania, in 1856. He was educated at Bowdoin College, Maine, and entered the engineering service of the United States Navy. He gained experience for his future career as engineer of a survey through Nicaragua, where it was intended at the time to construct the canal which afterward came into existence at Panama.

He explored the north of Greenland in 1891, marched across its great glacier fields, discovered and named Independence Bay, and crowned his list of trials by suffering a broken leg where surgeons were absent and medical comforts hardly to be had. But the ache could barely have been banished from his bones before he was back again, in 1893, for two years of work and study among the Eskimos of Smith's Sound.

As Kane had done earlier, he cultivated the friendship of the natives, learned their language and habits, taught them his, lived their life, and also learned to make their dogs part of his living equipment.

In the course of eight great journeys to the North, in which Peary beat all previous records before actually winning the goal, he demonstrated that a white man may live in the Arctic if he is prepared to follow the habits of the natives. Twice he was accompanied by his devoted wife, who was the first white woman to winter in the Arctic Circle. His daughter, Marie Peary, was born there in 1893.

THE MAN WHO FOUND THE NORTH POLE



ROBERT PEARY AS HE WAS IN THE CROWNING HOUR OF HIS GREAT ADVENTURE

Those who advise a pushing north of white tribes, as Stefansson does, must know the truth of the life as a hardy white man actually lives it. Here is a picture in Peary's own words of a typical adventure in the 1899 trip.

On the sixth of January, 1899, after a sledge journey in the very midnight of the great Arctic night, a journey over an unknown frozen track of such roughness as you can scarcely imagine, reduced to a diet of raw dog, I stumbled into Fort Conger, the abandoned headquarters of the Lady Franklin Bay expedition, with both feet frozen.

For six weeks I lay there on my back a helpless cripple, through the utter darkness, living principally on cornmeal and molasses, my companions trying to infuse a little warmth into the atmosphere by burning empty boxes and barrels, until the faint rays of returning daylight, in the latter part of February, permitted an attempt to reach my ship, two hundred and fifty miles to the south.

Lashed to a sledge, my feet wrapped in a musk-ox skin, I was carried on a journey made in 11 marches, of from 12 to 18 hours each, bumping and pounding over the broken ice of the Arctic sea. The mean minimum daily temperature during that march was $53\frac{1}{2}$ degrees below zero; the temperature on the



Bear Corner in Franz Josef Land, where Nansen and Jackson met.



Dr. Kane and his comrades in their winter quarters.



Peary and his dog friends on the famous march to the North Pole.

day we reached the ship was 65 degrees below zero, or 97 degrees of frost.

Such experiences did not leave him unmarked, and this indomitable man marched to the Pole without some of his toes, which had been destroyed by frostbite.

His many expeditions, always adding a little to knowledge, and carrying him step by step nearer his goal till he was actually within two hundred miles of it in 1906, were marked by dogged reduction of dangers and distances. It became difficult to raise money, but eventually a Peary Arctic Club was formed to pay his expenses. With \$50,000 from this source he set out in July, 1908, for what proved the final and triumphant effort. His ship was the Roosevelt; the captain, a Newfoundlander, Robert Bartlett, the finest ice master of his age; the crew under his command were all sons of Newfoundland.

The party, consisting of 7 white men, 17 Eskimos, 1 negro, with 19 sledges and 133 dogs, began its march in the middle of February.

In regular order the numbers of men and dogs were reduced, parties being successively sent back after depositing stores for the main party's return journey.

THE HERO WHO WENT BACK IN SIGHT OF HIS GREAT HOUR

The heroic Bartlett, who had handled the Roosevelt superbly through all her ice difficulties, bore the brunt of the expedition up to the 88th parallel. As a fact his work ended five miles short of that point, but he walked the extra five miles so that he might boast that he, with Peary, was the only white man in the world to reach that tremendous latitude. With one touch of imagination on the part of Peary, this fine Newfoundlander would have stood with his leader at the Pole, but it was not to be.

THE WHITE MAN AND THE BLACK MAN WHO STOOD TOGETHER AT THE POLE

The man who made the final advance with Peary was Matthew Henson, a negro; it was a white man and a black man who stood at the North Pole on April 6, 1909.

The final marches were without adventure, five marches of twenty-five miles each, with three Eskimos, the negro and forty dogs. At the end of the fifth march a sudden break in the clouds, somewhere about noon on April 6, 1909, enabled Peary to fix his position as 89° 57' North. The dream of reaching the pole was about to come true. After a short rest he and Matthew Henson went forward with one sledge with a double team of dogs. They went ten miles, and, another light breaking through the sky, Peary found that he had actually walked past the Pole!

He struck eastward for eight miles,

took fresh observations, and found that he had again reached and crossed the Pole.

All was empty white waste, snow and ice. Five miles from the Pole there was a break in the ice, and Peary, taking a sounding, found that he was standing over water which his measuring line of 9,000 feet could not fathom. The temperature (it was summer) was 33 degrees below zero.

So that here, at last, was the goal for which men had striven and suffered and died for three hundred years; and all was

silence, desolation, a lifeless ocean sheeted with ice, with no land for hundreds of miles.

The two men stood there for an hour, the American son of an English mother, and the son of a slave whose ancestors had been naked savages in Africa.

Peary reached the North Pole on April 6, 1909, and returning to civilization by rapid marches, he sent out his news by wireless from Indian Harbor, Labrador, so that the world knew the story early in the following September. At

that moment there was on the high seas a man sailing in quest of the North Pole, who, hearing of the American's success, turned his ship about, sailed across the world, and discovered the South Pole instead. It was Amundsen, the Norwegian.

EXPLORERS STILL PUSH INTO THE NORTHERN WASTES

The discovery of the North Pole did not make men any less eager to set out on Arctic explorations. Scientists wanted to know all about the life in that region of snow and ice. Business men gave money to aid parties to explore the top of the world because of the valuable minerals



The race of men of all nations for the North Pole. Foremost is Commander Peary, next the Duke of the Abruzzi, then Dr. Nansen, then Nares, Nordenskiöld and others.

that might be found. And there was so much yet unknown in the Far North that it was still an adventure to explore. That appealed to many hardy, courageous men.

For instance, there was Knud Rasmussen, a Dane, who explored Greenland and other Arctic lands. He started out in 1910. Two years later Vilhjalmur Stefansson, a Canadian, supported by the Canadian Government, set out to explore Beaufort Sea just north of Alaska. With Stefansson was a large party of scientists. Captain Robert A. Bartlett, whom we remember as a member of the Peary party, was in command of the chief ship, the *Karluk*. The *Karluk* was crushed by the ice and sank in the icy water, but the men and supplies were saved. For a year and a half no word was heard from the explorer. Some of the party were stranded on Wrangell Island, but most of them were rescued. Stefansson made many new discoveries before he returned in 1918. Stefansson had learned to live as the Eskimos lived and eat what they did. This he said made life easier in the Far North.

On a former expedition Stefansson and R. M. Anderson had discovered blond Eskimos who had never before been seen white men. This strange tribe was found in the vicinity of Victoria Island. When he was a member of the Anglo-American Arctic Expedition of 1906, Stefansson had spent his time with the Eskimo in the Mackenzie delta. There he had learned the habits and language of several tribes.

RADIO KEEPS MACMILLAN IN TOUCH WITH HOME

Donald B. MacMillan, an American, in 1913 was sent out by the American Geographical Society to search for Crocker Land, which had been reported by Peary as lying to the west of Grant Land. This party found no trace of Crocker Land, and it was rescued by a relief ship three years later. MacMillan set out to explore Baffin Land three years later. In 1923 and in 1925 he led expeditions to the north. By means of radio he kept in touch with civilization.

MacMillan reported that he had found Hecla Strait frozen solid. He regarded this as evidence that existing maps of Baffin Island were incorrect. He found traces of the Norsemen, probably from Greenland, who had visited the Baffin Bay country in the eleventh century.

Meanwhile Roald Amundsen had not

lost his love for the land of the snow and ice. He had planned a North Polar expedition just before the war, but gave up the idea until 1918. A year later he set out in his ship *Maud* to drift with the current across the North Pole. An accident to the vessel's propellers made him give up this plan. The *Maud* was put in ship shape, however, and in 1922 it started out to look for the polar drift.

Dr. Harald Sverdrup and Captain Wisting were in command. Amundsen did not go with the ship, as he planned to fly over the Pole. The flight was attempted in 1925, but after a narrow escape a return was made to Norway without reaching the Pole. The *Maud* also returned from an unsuccessful quest.

HARDSHIPS AND COLD DO NOT FRIGHTEN STURDY SOULS

There are others who have followed the ice trail to the North. Russia sent out several ambitious but ill-equipped expeditions, but they came to grief or accomplished little. Commander B. A. Vilkitski in 1913 discovered new land and named it Nicholas II Land. Of the German party under Lieutenant Schroder-Stranz, three men returned to tell the tale. W. S. Bruce, the Scottish polar explorer who headed an expedition to the North, gave up his project when war broke out.

Practically all the islands in the Arctic seas are now claimed by one nation or another. The time has gone when an explorer could bring to his country new territory by planting a flag on his discovery. In 1917 Denmark's right to Greenland was recognized. In 1914 Russia made a formal claim to the Arctic islands lying north of Asia. Norway owns Spitsbergen and Bear Island. All the islands to the north of the North American continent are claimed by Canada.

So it seems that the Arctic regions will continue to draw courageous men. Hardship and cold do not frighten men who have the souls to be explorers. Perhaps it will be a common thing some day to hear of airplanes flying over the frozen seas and covering enormous polar distances in a day. But when that day comes we shall honor and respect more than ever the brave band of brother explorers who gave their strength, and even their lives, to find out the secrets of the Far North.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 4859.

WITH MACMILLAN IN THE ARCTIC



Photo by E. O. Hovey, courtesy American Museum of Natural History.

This striking photograph, taken by a member of the D. B. MacMillan expedition to the Arctic, shows the explorer's ship Cluett in the foreground. This was taken at Cape York, Greenland.



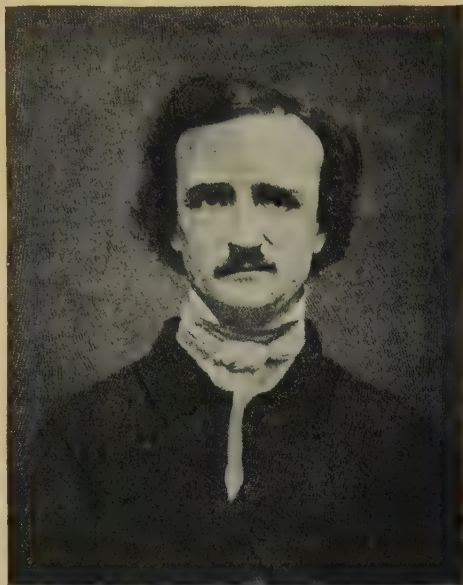
Among the members of the expedition were a number of Eskimos. Here we have E-took-a-when and his favorite husky standing beside Donald B. MacMillan himself. The two men are at Etah, Greenland.



Photos by D. B. MacMillan, courtesy American Museum of Natural History.

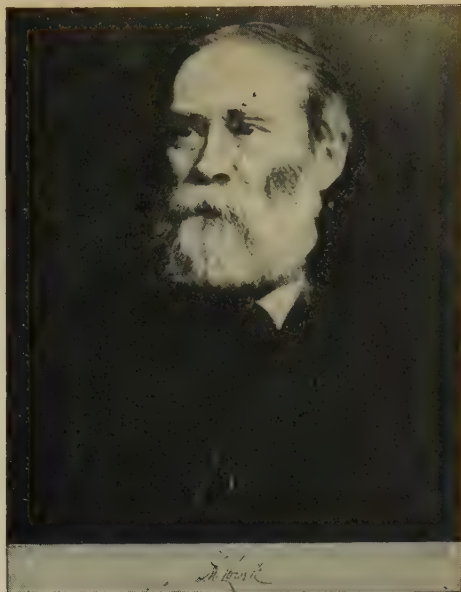
The dog-train is the best method of transportation in the Arctic lands. Our picture shows Donald B. MacMillan, his Eskimo driver E-took-e-shoo and two dog teams starting out in Ellesmere Land.

FOUR GREAT AMERICAN WRITERS

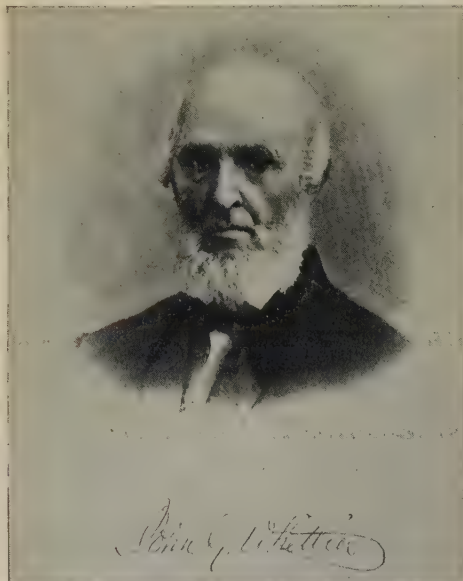


From a wood engraving by Timothy Cole.

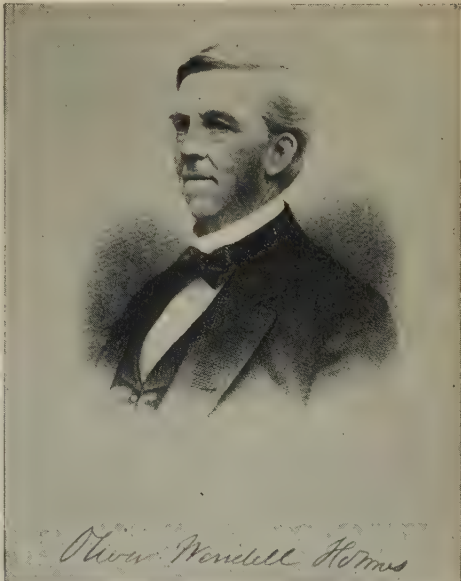
Edgar Allan Poe was born in Boston in January, 1809. He was the son of an actor, David Poe, but after his mother's early death was adopted by Mr. Allan, of Richmond, Virginia. His adopted parents gave him a very good education, ending with a course at the University of Virginia, which, however, was cut short by debts which he contracted.



James Russell Lowell was born at Cambridge, Massachusetts, in 1819, and died there in 1891. His father was minister of a Unitarian church. After graduating from Harvard College and Law School he began to publish his first poems, *A Year's Life*, which was soon followed by a collection entitled *Legend of Brittany*. Now fully launched in American letters, Lowell appeared in many rôles.



John Greenleaf Whittier was born in Haverhill, Massachusetts, and spent his early life on his father's farm. Later he entered upon editorial work in Boston and in Hartford. He worked vigorously against slavery, writing and speaking. His later years were spent with relatives at Oak Hill, Massachusetts. His literary work, though not abundant, was very constant, appearing usually in periodicals.



Oliver Wendell Holmes, American man of letters, was born at Cambridge in 1809. He graduated from Harvard College, and after a short attempt at law went in for the study of medicine, first at Harvard and then in Paris. He practiced in Boston on his return, and began at the same time to publish. It is in literature that his marked gifts are most easily to be found. His essays are full of brilliant wit, and his verse of gravity and humor.



Craigie House, Longfellow's home in Cambridge, Massachusetts.

AMERICAN LITERATURE TO THE CIVIL WAR PART II

AT the same time that Hawthorne was writing stories in New England, Edgar Allan Poe, who was in many respects a greater genius, was living, now in the South, now in the North, and writing stories of an entirely different kind from Hawthorne's, and poetry which is filled with sad, haunting music.

His life, partly through his own fault, was sad in the extreme. He was born in 1809 in Boston, where his father and mother, who were both on the stage, were playing at one of the theatres. He was not a New Englander, however. His father was from Maryland, and his mother was an Englishwoman. Two years after his birth they both died in Richmond, Virginia, and their two boys and a baby girl were left to the care of strangers. Edgar was adopted by a wealthy tobacco exporter and his wife because they had no children and wanted a boy to bring up as their son. They gave him their name, Allan, and were very kind to him—too kind, for he was a brilliant, wayward boy who needed loving discipline instead of the indulgence that he received. While he was a child his adopted parents took him



to England, where he attended school for some years, and after his return he went to school in Richmond, where he prepared for the university. In 1826 he was ready for college and entered the University of Virginia, but unfortunately he got into a dissipated set there, drank too much wine, and lost money at gambling. Angered by Poe's conduct, Mr. Allan would neither let him go back to college for his second year, although Poe stood high in his studies, nor would he give him the money to pay his debts. This disgrace stung Poe to the quick, and when Mr. Allan insisted that he go into the office and learn his business they quarreled, and Poe ran away to Boston and enlisted in the army.

This seemed to be a good place for him. He was rapidly promoted. At this time he wrote and published *Tamerlane*, a poem which pleased Mr. Allan so much that he forgave him and obtained an appointment to West Point for him. In a few months, however, Poe became restless, unhappy and dissatisfied, and when Mr. Allan refused to consent to his resignation he deliberately neglected his duties, was court-martialed and dismissed.

Naturally the disgrace hurt Mr. Allan, who refused to give him any more assistance, and from this time on he was thrown on his own resources.

They were not very great, for a poor poet had small chance of making a living with his pen alone. However, he went to New York and published a volume of poems which included *Israfel*. From New York he went to Baltimore, and from Baltimore to Richmond, where he found work as editor of *The Southern Literary Messenger*, which he made famous by his stories. Again his unhappy fondness for wine got him into trouble, and by the close of 1836 he was dismissed. By this time he was married to his little cousin Virginia Clemm, and with her and her mother he went to New York, from there to Philadelphia, and then back to New York, where he fell into dire poverty and his poor little wife died. Three years later, in 1849, he died in a hospital in Baltimore, at the age of forty.

When he died Poe was famous, both in Europe and in America, for his short stories and poems, and to this day no other American writer has had so much influence on European literature. Unlike the romances of Cooper and Hawthorne, which were founded on fact, Poe's stories originated in his imagination. Though his short stories are masterpieces, his characters are not great. In fact, we need not look for greatness of thought in his work, nor do we find high ideals or love of humanity there. What we do find is marked originality and an appreciation of the music of words such as no other writer has shown. He knew how to create beauty by the repetition of a word, a syllable, or, it might be, of only a vowel. We find this in *The Raven*, which made him famous, and more especially in the beautiful melody of *The Bells*. *Annabel Lee*, with its haunting refrain; *Ulalume*; *For Annie*; *Israfel*; *The Raven*; and *To Helen* are his most beautiful poems. Fantastic horror and ghostly fear are the chief emotions on which he plays in his weird, fascinating tales, and he fixes our minds on the morbid and the terrible. His best stories are *Eleonora*, *The Pit and the Pendulum*, *The Masque of the Red Death*, *The Black Cat*, *The Gold-Bug*, and *The Fall of the House of Usher*. You may find the story of, and a short excerpt from, *The Gold-bug* in *Famous Books*.

HENRY WADSWORTH LONGFELLOW, THE "CHILDREN'S POET"

The first decade of the nineteenth century was a fortunate one for the nation, for in that period were born many of the men who gave the United States an independent and distinctive place in literature. Emerson, as we have seen, was born in 1803, Hawthorne in 1804, Poe in 1809, and we now come to another group of poets—Longfellow and Whittier, who first saw the light in 1807, and Holmes, who was born in 1809.

The first of these men, Henry Wadsworth Longfellow, was a native of Portland, Maine, where his father was a lawyer. He had a happy, sheltered childhood, and at the age of fifteen went to Bowdoin, where he entered the sophomore class and was Hawthorne's classmate. Just at the time that he graduated, it was decided to add a professor of modern languages to the faculty at Bowdoin. The professorship was offered to Longfellow. In 1826 he went to Europe to prepare himself by three years of study, which he spent chiefly in France, Italy and Spain. He taught so successfully at Bowdoin that in 1835 he was called to Harvard, and from that time we associate him with Harvard and Cambridge.

Before he settled down at Harvard he spent a year in Germany, and in 1836 took up his new work. His wife had died while they were in Europe, but in 1841 he married again and led a happy home life in the old Craigie Mansion, almost under the shade of the Washington Elm. As years went on he became more and more famous as a poet, and finally gave up teaching altogether in order to devote himself to writing poetry and translating poems from other languages. In 1861, after twenty years of happiness, his wife was accidentally burned to death; but except for this great tragedy his life flowed smoothly on. He was surrounded by friends, loved and admired at home, and in England took place second only to Tennyson. *The Children's Hour* shows us how he loved children, and he was loved by them in return. In fact, he was called the "Children's Poet," and toward the end of his life children presented him with a great chair made from the wood of the chestnut tree under which the "village smithy" stood. He lived to the age of seventy-five and died in March,

1882, as gently as he had lived, leaving a blank in American letters which was hard to fill.

Longfellow was not a great poet, but for all that we may speak of him as a world-poet, for he is still loved and will probably continue to be loved wherever the English language is spoken. Love was the motive of his life and showed through all his verse. He wrote of the homely, everyday things of life, and turned them into poetry. The Village

Blacksmith, The Psalm of Life, A Gray Day, The Hanging of the Crane, The Bridge, The Day is Done, are only a few of the many poems by which we remember him. Of his long poems, Evangeline and Hiawatha are the most popular, but The Courtship of Miles Standish is the best.

THE QUAKER POET

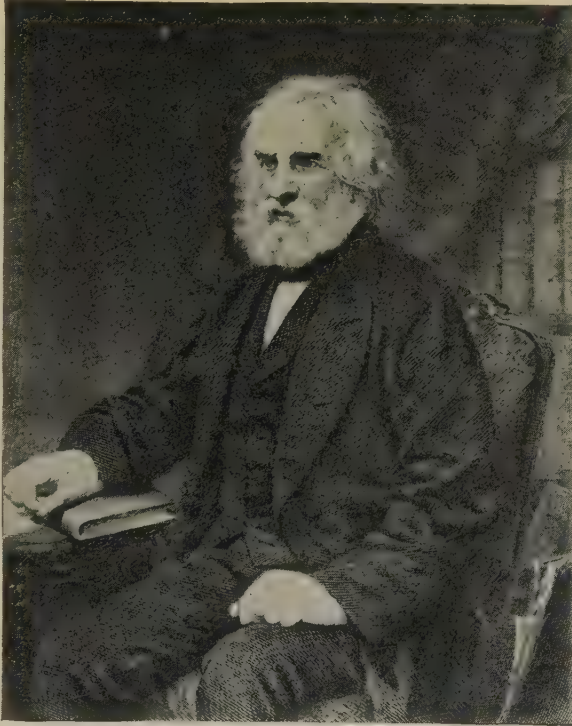
The life of John Greenleaf Whittier did not run so smoothly as Longfellow's, nor was his lot cast in such pleasant places. He was born in 1807 at East Haverhill, where his father had a farm on which his family, who belonged to the Society of Friends, had lived for generations, and where life was not easy. The district school gave him part of his early education. How he got the rest you can learn from The Barefoot Boy, a delightful poem in which he enumerates his childhood occupations and pleasures. While Longfellow was studying at Bowdoin, Whittier was following the plow and generally helping his father to work the farm, and at the same time he was earnestly trying to learn to express his thoughts in poetry. His small home library contained the Bible, Shakespeare,

Scott's poems and the journals of eighteenth-century Quaker leaders. He must have learned most of these books by heart, and thus laid a good foundation for his later work; but it took him many years to study all he missed in his youth, and though his mind was stronger than Longfellow's, he never became so good an artist. When he was about fourteen Joshua Coffin, a school teacher who stayed in the Whittier household in the course of "boarding round," gave him the poems of Robert Burns, and these took hold of his mind and had a strong influence on his poetry.

His family of course knew of his efforts, but the shy boy might never have thought of publishing his poems had not his sister Mary sent one of them to The Free Press of Newburyport; and the first knowledge that Whittier had that it had left the house was when he opened a copy of the paper and found it there in print.

With this encouragement he sent others, and the editor, William Lloyd Garrison, was so much impressed by them that he paid the boy a visit, and after this his father consented to his going for a year to Haverhill Academy. This ended his formal education, but he had long before learned the secret of study, and was now able to go on independently.

After he left Haverhill he went to Boston and found employment in a small publishing house as editor of a political journal, The Manufacturer. He stayed two years in Boston, then we find him back at Haverhill, and after his father's death he went to Hartford to edit a paper there. His health, however, pre-



Henry Wadsworth Longfellow.

vented him from continuing this work, and after a time he bought a house in the village of Amesbury, where he lived until his death in 1892.

Throughout his life he took part in politics, and in 1835 and 1836 he was a member of the state legislature. Although a "silent, shy, peace-loving man," he was a very active member of the Prohibition party and had no small part in rousing the North against slavery. Indeed his antislavery poems, which make up a large proportion of his work, and into which he put all the strength of his feeling, were one of the forces which made the Civil War inevitable. Among these poems the stirring *Barbara Frietchie* and *The Watchers* are the best. *Randolph of Roanoke*, and *Massachusetts* are also fine poems, but, like most poetry written with an object, they lose their interest as time goes on. This is not the case, however, with *Ichabod*, the great lyric poem in which, with all the passion in his nature, he mourned Webster's upholding in Congress the measure known as the Compromise of 1850.

Maud Muller, Skipper Ireson's Ride, Barclay of Ury, *The Barefoot Boy*, *In Schooldays* and *Snow-bound* have endeared Whittier to all lovers of poetry. *Snow-bound* alone is enough to keep his name alive, for in it he gives a vivid and unforgettable picture of winter life in old New England in the picturesque times that were passing even in his day. This poem and *Ichabod* are the two which give him a claim to greatness.

OLIVER WENDELL HOLMES, THE PHYSICIAN-POET

One of Whittier's last poems was addressed to his old friend, the physician-poet and humorous essayist Oliver Wendell Holmes, who was born at Cambridge in 1809, and lived until 1894. He graduated from Harvard in 1829 and took up the practice of medicine in Boston. In 1847 he was made professor of anatomy and physiology at Harvard, and we can imagine how the play of his humor lightened his lectures and made him a favorite with the students.

Meantime he had begun to write essays and poems. In his college days he was class poet. *Old Ironsides*, which helped to save the famous frigate *Constitution* from destruction, was written when he was only twenty-one. While he practiced medicine and taught in the univer-

sity he went on writing verses, and even gave lyceum lectures in verse. Then, in 1857, Lowell, who had become editor of *The Atlantic Monthly*, refused to accept the appointment unless Dr. Holmes consented to write for it, and thus it came about that the cheery, humorous professor contributed his best essays, with poems interspersed, to the magazine. *The Autocrat of the Breakfast Table* is particularly rich in poems. The lovely *Chambered Nautilus* is one of these, and *The Deacon's Masterpiece*, which in itself is a masterpiece in humor. *The Autocrat of the Breakfast Table*, *The Poet at the Breakfast Table* and *The Professor at the Breakfast Table* are all good table-talk books, and of these *The Autocrat* is the best. In addition to these essays Holmes wrote two or three other books in the form of the novel, but they are much too full of medical knowledge to be anything but studies. Of these *Elsie Venner* is most worth reading.

JAMES RUSSELL LOWELL, POET, CRITIC AND ESSAYIST

Dr. Holmes outlived every one of the poet friends of whom we have been speaking, and even the youngest of the band, James Russell Lowell, who was not born until 1817 and who died in 1891.

Lowell was in some ways a greater poet than any who had come before him, and in every way a better writer than all the rest. Like Holmes, he was both satirical and humorous. His satire was more biting than Holmes's, and his poetry was more robust than either Whittier's or Longfellow's, while his English was more polished than that of any of his predecessors or his contemporaries. He had not Poe's originality, but he touches life more closely, and though Poe has had more influence abroad by reason of his originality, Lowell has had much more influence on literature and on culture in America.

He was born in Cambridge, where his father was a clergyman, and lived there for the greater part of his life. Naturally he went to Harvard, where he graduated in 1838, and though he was educated for the law, he turned from it to literature as his life-work and began to write poems, book-reviews and political articles for various publications. In 1846 he married Maria White, a poet also, but out of the happiness that his marriage brought him great sorrow came, for his wife died in

1853, and of their four children only one survived her.

In 1846 he was practically unknown, but in that year the Mexican War roused his wrath and he gave vent to it in the first set of his famous Biglow Papers. In these he made Hosea and Ezekiel Biglow, Birdofredum Sawin and the Reverend Homes Wilbur the mouthpieces for the wit and satire with which he lashed the war, the motives that dictated it, and the institution of slavery. The papers, which were partly written in Yankee dialect, appeared in

The Boston Courier and became immensely popular. They were published in book form in 1848, and at about the same time Lowell published A Fable for Critics, in which by turns he praised and blamed all his contemporaries. He wrote The Vision of Sir Launfal in the same year, while several of his other best-known poems—A Legend of Brittany, The Shepherd of King Admetus, and Rhœcus—had been written some time earlier. In 1855 he suc-

ceeded Longfellow at Harvard, and two years later he married again. In 1857 he became editor of The Atlantic Monthly, and though he resigned in 1861, he kept up his association with the magazine and in it published his second set of Biglow Papers, which were prompted by the Civil War and were written in 1862.

Lowell wrote two long poems, The Cathedral and Appledore, but he is at his best in his four great Commemoration, or Memorial, Odes, in which he gave his passionate patriotism full sway. They formed the bulk of his poetical writings after the Civil War, for as years went on

he turned his attention more and more to prose, and gave to the world the delightful essays on literature and politics which have made him better known as an essayist than as a poet.

WALT WHITMAN, THE GOOD GRAY POET

The poets of whom we have been reading all called to their assistance a knowledge of the past and a wide acquaintance with the literature of other countries. Now we come to a man whose ways were utterly different, who cared nothing for

history and little for the present-day life of countries not his own.

This man, Walter Whitman, was born in 1819 near the old village of Huntington, on Long Island. His father, a small farmer and carpenter, moved to Brooklyn when Walter, or Walt, as he became known, was about six years old, and the boy went to the public schools until the age of eleven, when he left to become an office boy.

It would take

too long to give the details of his life during the next twenty years. At the age of twelve he began to learn typesetting; then he became a school teacher; after that he tried to edit a weekly newspaper in Huntington, but failed, and went back to New York, where he studied closely the men and women who crowded the streets and did the work of the city.

By 1846 he had worked himself up to the position of editor on The Brooklyn Daily Eagle, which he held for two years and then lost, chiefly because of his political opinions. He turned his freedom to good account, however, by taking a long trip through the country as far



Photo, courtesy Metropolitan Museum of Art.

Walt Whitman—From the painting by J. W. Alexander.

south as New Orleans, where he worked for three months, and then home by way of the Mississippi and the Great Lakes to Brooklyn. After his return he edited *The Brooklyn Freeman* for a time, and is believed to have taken to building, and it is certain that he spent a great deal of time in study. He had been writing for some time, and in 1855 he published a small volume of poetry which he called *Leaves of Grass*, to which a good deal of opposition was raised. Although he called it poetry, it was unlike any poetry that had been written before. He had deliberately departed from the ordinary form; the lines of the poems are not rhymed, and they are of unequal lengths.



Harriet Beecher Stowe.

In fact, he transgressed every rule of poetry that had hitherto been made, and invented for himself a new form, which is now called *vers libre*, or free verse. There was much in the poems that was crude, yet the writing showed strong originality and poetic power.

While he was not an Abolitionist, Whitman was opposed to slavery, and wrote some of his best poems on the Civil War—chants he called them—in which he makes us hear the beating of the drums and see the marching of men from far distances. He went down to Washington in the second year of the war to seek his brother who had been wounded, and stayed there to care for the sick and wounded who crowded the hospitals after every battle. This was the greatest work of his life, and from it he drew inspiration for poems which were published in

Drum Taps and *The Wound Dresser*, in which he gives an unforgettable picture of military hospitals of those days. On the death of Lincoln he wrote *When Lilacs Last in the Door-yard Bloom'd*, and *O Captain, My Captain*, two poems which alone are enough to prove his greatness. His work in Washington won for him the title of the "Good Gray Poet," but it helped to ruin his health, and the later years of his life were spent in invalidism at Camden, New Jersey.

Whitman could write in metre when he chose, as he did in the lyrics *O Captain, My Captain*, and *Out of the Cradle Endlessly Rocking*, but as a rule he used the free verse which he invented, and of which a good example is found in *When Lilacs Last in the Door-yard Bloom'd*.

We have said nothing so far about women writers because, though there were many of them, none of them had so much influence on American literature as the famous men of whom we have been speaking. But there was one woman writer, Mrs. Harriet Beecher Stowe, who by writing one book, *Uncle Tom's Cabin*, had a profound effect on the history of the nation. This book, which was published in 1851, in an Abolition paper, had more influence than any other in bringing the strife between the North and the South to the point of war.

Mrs. Stowe, who was the daughter of Lyman Beecher, a famous Congregational minister, was born at Litchfield, Connecticut, in 1811. She lived in Cincinnati, Ohio, for a number of years before and after her marriage, in 1836, to the Reverend Calvin E. Stowe, and there talked to numbers of fugitive slaves, from whom she obtained most of the material for her story.

While these are perhaps the most important figures in the period, there are many others who were popular in their day. Nathaniel P. Willis (1806-67) wrote much in prose and verse, but he is now almost forgotten. The Cary sisters, Alice (1820-75) and Phoebe (1824-71), wrote some pleasing poetry. A very popular novel was the *Wide, Wide World*, by Susan Warner (1819-85), which was published in 1850. Bayard Taylor (1825-78) wrote both in prose and verse, and Thomas Buchanan Read (1822-72) wrote some stirring poems, a few of which are remembered.

THE NEXT STORY OF LITERATURE IS ON PAGE 4815.



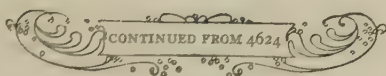
THE LITTLE BLACK TANGRAMS

TANGRAMS are little black cards of various shapes that are supposed to have been first designed in China many centuries ago. We can make a set of tangrams by taking a square of black cardboard and cutting it up into seven pieces as shown in the picture on this page.

Cardboard that is black on both sides can be bought at most stationers', but if there is any difficulty we can ourselves make the card black by coloring it with ink, or by pasting over ordinary white card a piece of black paper. It is not absolutely essential that the card be black; any other dark color does fairly well, although it must be acknowledged that black is really best for the purpose for which tangrams are used—it shows up so well.

To cut the tangrams we take a square of card, and this may be of any serviceable size—say, 3 inches square. We cut with a sharp penknife from *C* to *B*. Then we find the middle point of *CB*, which is *E*, and cut from *E* to *D*. The remaining pieces are easily cut to the right sizes, for the various points to and from which we cut are all the middle points of lines. Thus, *G* is the middle of *AB*, *F* of *AC*, *J* of *FG*, *K* of *CE*, *H* of *EB*. Having cut the square up as shown, we have seven pieces of card of varying size—two large triangles, two small, one of medium size, a square, and a rhomboid, *FCKJ*. The card should be black on both sides so that this latter piece may be used on either of its sides.

By putting these seven pieces of card together, there is scarcely anything that we cannot make with the little black tangrams. It must be understood that in each picture every one of the seven pieces of card has to be used; and we must let the whole of each piece of card be completely seen—that is,



we must not put one piece partly over another. That pictures of thousands of objects of anything, in fact, can be made with these seven little pieces of card seems impossible, but it is a fact. Take, for instance, the picture at the top of this page, showing children at play.

Each individual in the group is made up from one set of tangrams, and the baby-carriage is also made up from one set, so



How to cut the tangrams.

that the whole group of four children and the baby-carriage can be made out of five sets of tangrams, one set being used complete for each figure. Then, again, in the picture of chessmen each particular chessman is made of one complete set of tangrams. These are only a few examples of what can be done with the tangrams. We can make men, animals, birds, fishes, flowers, boats, houses, shoes, lanterns, faces, geometrical figures, and so on. It is not always easy, even with a finished tangram picture in front of us as a pattern, to put the tangrams together properly to produce the picture, and we may try it with the examples given on this page. Every one of these can be made up exactly from a set of tangrams.



Chessmen made from tangrams.

Even artists have declared it quite impossible to form certain figures and objects out of tangrams, and when they have afterward been shown how these can be made up,

they have expressed great wonder at the possibilities in tangrams. Even the letters of the alphabet can be made quite well, a complete set being used for each letter. With a few sets of tangram cards, endless fun and amusement, together with healthy intellectual exercise, can be obtained, and the more one uses these cards for picture-building, the more fascinating they seem to be.

HOW TO TREAT BROKEN BONES

A THIRD LESSON IN FIRST AID TO THE INJURED

CONTINUED FROM PAGE 4619

PERHAPS the most common form of accident in which the rendering of first aid to the injured person is necessary is that in which some bone of the body is broken. This breaking of a bone is called a fracture, and fracture comes from a Latin word meaning "to break." A fracture may occur by what is called direct violence, as when a blow is given or a wagon wheel runs over a foot. In these cases the bone breaks at a place where the force is applied. A fracture may also occur by indirect violence, as when a boy falls on his hands and breaks a collar-bone, or when a man falls on his feet and fractures his skull.

Now, all the people who are so unfortunate as to break a bone do not do so in the same way, and different names are given to the different kinds of fractures.

A simple fracture is where the bone is broken once, and there is little or no injury to the soft parts of the body near the bone. It is a clean break.

A compound fracture is where, in addition to the broken bone, there is a wound leading from the outside of the body to the bone, thus enabling germs in the air to reach the broken bone. Sometimes the wound is caused by the sharp end of the broken bone sticking through the flesh, and at other times it may be inflicted from outside by the implement that broke the bone, as when a bullet breaks a bone.

A complicated fracture is when there is not only a broken bone, but an injury to one of the organs of the body, as to a lung, or to the brain, or to an important blood-vessel. A multiple, or comminuted, fracture is the breaking of the bone in more places than one, and, of course, this kind of fracture may also be compound. Comminuted is derived from a Latin word that means crushed or powdered.

An impacted fracture is one in which the two ends of broken bone are forced into one another. A greenstick fracture takes place when a young child meets with an accident that would result in a broken bone to an older person. The child's bone, being soft, acts very much like a green branch, because, instead of breaking right across, it bends and cracks only.

In this lesson we are going to learn what to do in the case of broken arms and legs, but first of all we must learn to know when bones are broken. There are some methods of knowing that a bone is broken which must be used only by a qualified doctor; but there are five different tests that we who are going to render first aid may apply without any risk, and by some or all of these we can tell beyond doubt when a fracture has occurred.

First of all, there is usually pain at the place where the bone is broken. Then there

is what doctors call inability—that is, loss of power in the limb below the place where the bone is broken. The part where the fracture occurs will usually be swollen, and it is important that we should not think a person is less seriously injured than he really is because, owing to the swelling, we cannot see some of the

other signs of a fracture. If there is the slightest doubt as to the nature of an injury, it is by far the best to treat it as a fracture. The part where a bone is broken often becomes deformed—that is to say, has an unnatural position or appearance. A broken leg, for instance, may sometimes appear shorter than it should be. When the broken bone is quite near to the skin, by drawing the hand gently along the surface of the place we can often feel and locate the break. Of course, if the fracture is a compound one the bone can be seen.

The most important thing to remember in a case of fracture is that

the patient must on no account be lifted off the ground to be placed on a stretcher or in a cab until some kind of splint or support has been found and tied to the broken limb to keep it in one position.

For first aid, proper medical splints are not often available, and so we have to make use of anything that is ready to hand, and it is most surprising how many things can be utilized for splints. Among other things that are useful are umbrellas, walking-sticks, baseball bats, rifles, flag-sticks, pitchforks, fire-irons, boards, fence-posts, boughs of trees, bundles of twigs, bundles of firewood, pieces of stout cardboard, newspapers folded up, billiard-cues, rolled-up maps or any pictures that have a wooden roller, tools such as chisels, hammers, saws and screw-drivers. The chief thing that is needed in a splint is that the article used should be long enough and firm enough to keep the parts of the limb above and below the fracture perfectly free from the slightest movement. Splints of all kinds should be padded with clothing.

Splints are tied to the broken limb with bandages, and the regular triangular bandages are the best; but if these are not to be had, we may use neckties, scarves, belts, strips of toweling or sacking, or, indeed, anything that can be transformed rapidly into a bandage. The bandages adjusting the splint should be placed twice round the limb and splint, if possible, before tying, and they should always be tied firmly, though not tightly.

When regular triangular bandages are used, they should be folded narrow if wanted for the arm or forearm, and narrow or medium if to be used for the thigh or leg. When tying the splint in position, the bandages above the fracture should be put on first, in order to keep



1. Bandage and sling for a broken humerus.



2. The large sling.

the splint firm. Of course, should there be bleeding from the wound, this must be carefully attended to before the splints are put on; but we shall learn how to stop bleeding in a later lesson.

After a fracture has been attended to, the patient must be covered with coats or other garments to keep him warm, even though the weather be not cold. This avoids trouble.

Now we shall learn how to treat different fractures of the arm or leg. When the humerus is broken, we make three or four short splints reaching from the shoulder to the elbow, securing them in position with bandages as shown in picture 1. The first splint must not be so long that it will press on the blood-vessels at the elbow-joint. The forearm must then be supported in a small sling. There are two kinds of arm-slings—the large and the small—both made from a triangular bandage. For a large sling we open out the bandage, place one end over the shoulder on the uninjured side and, bringing it round the neck, tie it with a reef knot to the other end, as shown in picture 2. The loose point is brought in front of the injured arm and pinned with two pins. For a small arm-sling we use the triangular bandage folded broad, and tie it round the neck in the same manner as a large bandage.

When the forearm of an injured limb is placed in a sling, the hand should always be slightly higher than the elbow. Of course where no proper bandages are available, anything may be used for a sling.

When there is a fracture of one or both bones of the forearm, take two well-padded splints reaching from the elbow to the finger-tips, put one inside near the bone and one outside, and bandage them to the arm, using three bandages, one above and one below the fracture, and one around the hand, as shown in picture 3. Then support the forearm in a large arm-sling. For a fracture of the hand or fingers, put a padded splint to the front of the hand from beyond the finger-tips to above the wrist, bandage with a narrow bandage as shown in picture 4, and support in a large arm-sling. It is important that a fracture of the arm or wrist should be properly treated from the first, otherwise the injured part may never regain its full strength and use.

Fractures of the elbow-joint are serious and must not be left longer than absolutely necessary, as they require proper medical attention. In such cases the only thing we should try to do is to rest the patient's arm upon a pillow in the most comfortable position, and summon a doctor as quickly as possible.

A fractured thigh-bone is a most serious injury, and must have careful attention. We must place the patient on his back. Then someone must hold the ankle and foot and very gently pull the foot down until it is quite level

with the other foot. Then, while the foot is held in position a long splint reaching the entire length from the foot to the armpit must be placed on the outside of the injured leg, and a shorter splint inside, and the whole bandaged carefully together as in picture 5. One bandage goes round the body below the armpits, the next round the hips, the next just above the fracture, the next just below the fracture, the next lower down the leg, and the next round the ankles, to be tied beneath the foot. Still another bandage is tied round the knee. The inner splint is often dispensed with and the two legs are tied together, the sound leg supporting the injured one.

When the kneecap is fractured, the patient should lie on his back with his shoulders and head raised up. The leg should be straightened, and the foot raised and rested on a cushion, block of wood, heap of clothing, or anything of that kind that is immediately available. A

long, flat splint is placed at the back of the leg and tied just above and below the injured kneecap, at the thigh, and just above the feet. It is most essential that the foot be kept raised off the ground until the doctor arrives.

For a fracture of either or both of the lower leg-bones, the treatment is as in the case of a fractured thigh, with the exception that the splints are kept in position by bandages tied immediately above and below the fracture, just above the knee, round both ankles, and round both knees.

For a crushed or fractured foot, remove the shoe by slitting the back seam and undoing the laces; place a padded splint to the sole of the foot

from toe to heel, and bandage like a figure eight, as shown in picture 6.

Always remember in tying the bandages that, no matter where the fracture may be, or what kind of fracture it is, the bandage must be tied firmly, but not so tightly that it will interfere in any way with the circulation of the blood. That would be very harmful for the patient, and if persisted in might cause a very painful sore. A bandaged hand should be slightly raised in order that the finger-tips may be at a higher level than the elbow.

For a sprained or broken ankle a broad bandage is used. The centre is placed under the heel and the ends are brought over the instep and crossed. One end is passed around the ankle and the other around the foot at the instep. Again the ends are crossed and brought around the sole of the foot, and up again over the instep, where a knot is tied. The patient should not be allowed to move the ankle or joint. Less blood will rush to the injured member if the ankle is raised on a high cushion. Hot or cold cloths may be wrapped around the injured ankle before the bandage is applied.

The next lesson in first aid is on page 4847.



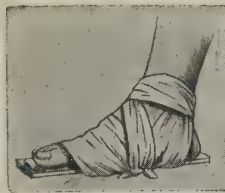
3. A broken forearm bandaged.



4. Bandage for broken fingers.



5. A broom used as a splint for a broken thigh-bone.



6. A broken foot bandaged.

A CONVENIENT BOX FOR KNIVES AND FORKS

THIS convenient knife-and-fork box will be much appreciated by the mother of the boy or girl who is thoughtful enough to make it for her. This easily made box is given two compartments and a handle by extending the partition which aids in finding the desired kitchen knife or fork more readily and assists in the handling of the box quickly.

Any thin soft wood which is available may be used to construct this useful box, although it is suggested that $\frac{3}{8}$ -inch poplar or whitewood will be found especially suitable for this purpose. The stock for this simple box construction is shaped into six parts as follows:

- 2 pieces $\frac{3}{8}$ " $\times$ 2 $\frac{1}{8}$ " $\times$ 11" for the sides.
- 2 pieces $\frac{3}{8}$ " $\times$ 2 $\frac{1}{8}$ " $\times$ 8 $\frac{1}{4}$ " for the ends.
- 1 piece $\frac{3}{8}$ " $\times$ 3 $\frac{1}{8}$ " $\times$ 10 $\frac{1}{4}$ " for the partition.
- 1 piece $\frac{3}{8}$ " $\times$ 9" $\times$ 11" for the bottom. Now we can start.

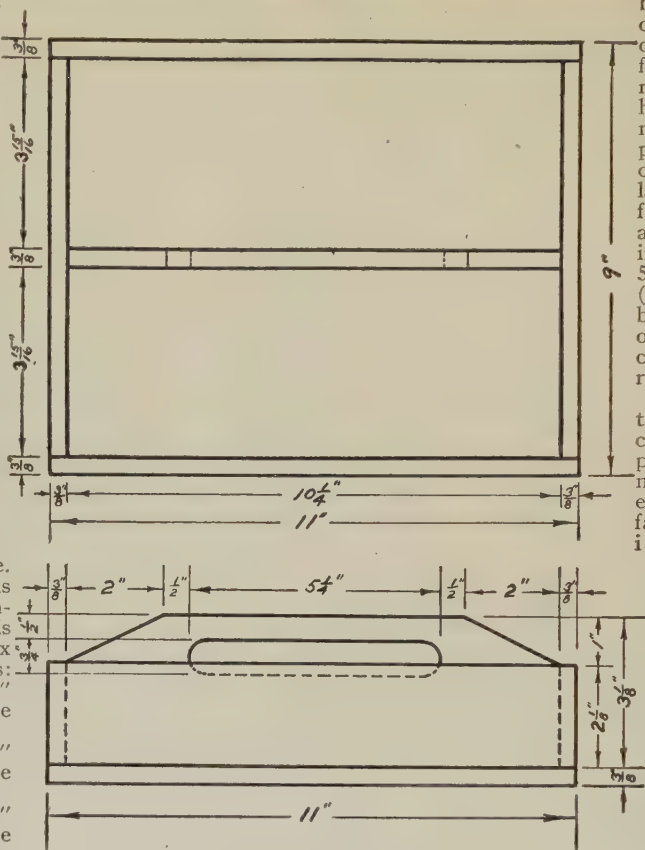
All of these parts are now ready to be sandpapered, with the exception of the partition, which is laid out and shaped as shown in the front view of the working drawing. The cor-

ners of the partition, which extends above the box for the handle, are cut off at an angle, for obvious reasons. As shown, this angle is had

by measuring down 1 inch and over 2 inches from either corner. An oblong hole is then made to complete the handle. This is first laid out $\frac{1}{2}$ inch from the top and is made $\frac{3}{4}$ inch wide and 5 $\frac{1}{4}$ inches long (see drawing) by boring a series of holes and chiseling out the remaining wood.

After all of the parts are carefully sandpapered to remove any rough edges and surfaces, the box is assembled and fastened together with 1-inch brads. It will be found most satisfactory to place the parts in their respective positions first in order to be certain that each one fits properly before the nailing is begun. A brad-

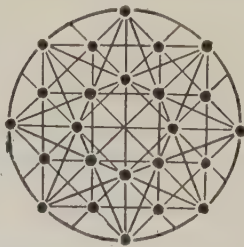
awl will assist you in starting the nails so that the wood will not split. If you begin by nailing the sides to the ends, then the bottom to the frame before fastening the partition, the process will be simplified.



Plan for knife-and-fork box.

THE ANSWER TO THE PUZZLE OF THE TREES

ALTHOUGH it had at first seemed to the gardener quite impossible that 24 trees could be planted in such a way as to make 28 rows, with 4 trees in each, and these in a straight line, yet the gentleman about whom we read on page 4620 was soon able to show that this was no impossibility at all, but in fact quite an easy matter. He drew a plan which showed exactly how the trees might be placed so as to fulfill the conditions that he had laid down, and this plan, which the gardener used and followed in carrying out his master's orders, is given here



so that we may see the manner in which the trees were planted. It will be noticed, of course, that the rows do not stand one after another like a regiment of soldiers on parade, but that was not required, and, of course, with only 24 trees, it would be impossible to plant the rows in that way. But there are, nevertheless, 28 rows, each containing 4 trees in a straight line, and the gentleman drew the lines of each row on his plan, for the guidance of his gardener, so that there might be no difficulty about the planting of the trees. The gardener followed the plan exactly.

HOW TO SHARPEN EDGE TOOLS

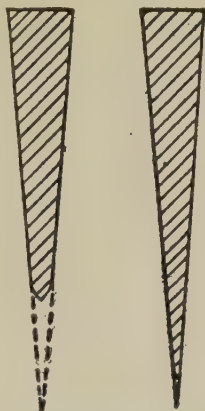
ALL edge tools should be kept sharp if good work is to be done. Perhaps you have observed that some tools are sharpened on one side, while others are sharpened on both sides. A tool which is sharpened on both sides, such as a knife, an ax or a cold chisel, is called a wedge-edge tool; while one which is sharpened on only one side, such as a chisel or a plane iron, is known as a bevel-edge tool. Tools of both types are frequently used and need to be sharpened from time to time.

In sharpening any wedge-edge tool, the tool should be held on a grindstone or emery-wheel in such a position as will give the desired wedge shape. Of course the exact thickness of this wedge will necessarily be determined both by the kind of tool that is to be sharpened and by the nature of work for which the tool is to be used. In sharpening a cold chisel, for example, a thick wedge is desirable, while a knife requires a thin wedge. In grinding, care should be taken to avoid burning the tool, as this removes its temper.

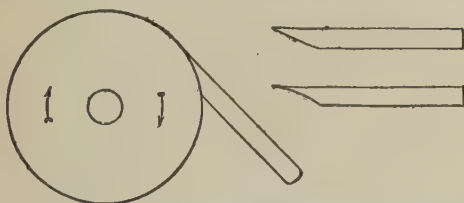
Picture 1 shows cross-section drawings of one knife-blade which has been incorrectly sharpened and one which has been correctly sharpened. After the grinding is completed the sharpening of the knife-blade or other wedge-edge tool is finished on an oilstone.

Likewise, in sharpening a bevel-edge tool you must first decide upon the angle or bevel needed before you can hold the tool in position to grind it correctly. In grinding, care must be taken as before to avoid overheating the tool. Picture 2 shows drawings of a chisel which is being sharpened on the grindstone, as well as one which has been ground with a plain bevel and one which has been hollow ground. After grinding, the bevel-edge tool is also sharpened on an oilstone. Picture 3 shows appearance of one chisel which is properly sharpened and another which is incorrectly sharpened.

With a little practice in following these suggestions, in a short time any boy or girl should be able to sharpen the common tools.



1. Cross-section of knife-blade incorrectly and correctly sharpened.



2. Position of chisel on grindstone. Plain bevel panel and hollow ground.



3. Correctly and incorrectly sharpened chisels.

THE PROBLEM OF THE TRAVELER'S DINNER

THE Arabs about whom we read on page 4622 were very much astonished at the decision of the magistrate, and thought at first that he must have made a mistake. But he repeated his decision, and when the traveler who had possessed 3 loaves protested that it was against all justice that he, who had only 2 loaves fewer than his companion, should receive only 1 coin, while the other man received 7, the magistrate offered to explain why he had ordered the money to be divided in this way.

"One of you had 5 loaves," he said, "and the other had 3, making 8 loaves in all, and then, when the third traveler came up and joined, the 8 loaves were divided equally between the three of you. Now suppose each loaf

to be divided into 3 equal parts; there would, of course, be 24 parts, and as you divided equally between three of you, each received what was equal to 8 of these parts. But one traveler originally had 5 loaves, or 15 parts, and as he only consumed 8 parts, he must have given 7 to the foodless traveler. The other man had originally 3 loaves, or 9 parts, and as he consumed 8, he only gave 1 part to the foodless traveler. Therefore, as you can see, my decision is quite fair; the 7 coins go to the man who gave 7 parts, and the 1 coin to the man who gave 1 part." Both the travelers had to agree that this was quite fair. But it was too late for the second man to do more than mourn over his mistake.

HOW TO TELL A CARD BY TOUCHING IT

A VERY clever trick, and one which never fails to excite astonishment at an evening party, is to select all the court cards when blindfolded; but before commencing it you must take one of the party into your confidence and get him to assist you. After you have satisfied the company that your eyes are tightly bound, take the pack in your hands, and holding

up one of the cards in view of the whole company, feel the face of it with your fingers. If it is a court card, your confederate, who should be seated near to you, must tread on your toe. You then proclaim that it is a court card, and proceed to the next. Should you then turn up a common card your confederate takes no notice of it, and you say nothing.

EASILY MADE RUSTIC FURNITURE

IT is less expensive to make many articles of rustic carpentry for the garden than it is to purchase the factory-made or shop-made articles that serve the same purpose, and that do not look nearly so appropriate for their surroundings. If we look at the large pedestal flower-box in picture 1, we can see that this work is eminently attractive in appearance, and it is comparatively easy to do. For the flower-box in question we first make the box itself. This is made of plain boards—four of them—from any old packing-case that we are fortunate enough to possess. The four should be, say, 15 inches wide at the top, 15 inches deep, and 1 inch thick. But the sizes are not important so long as all four pieces are the same size.

The bottom should be square and not less than 1 inch thick, its size being suitable for the bottom, or smaller end, of the box. Its edges should be trimmed or planed to a bevel so as to fit the sides accurately. We should make four or five $\frac{1}{2}$ -inch holes in the bottom—not in the centre—to carry off the water which may accumulate in the box, and which, if left, would turn the earth sour and kill any growing plant. This part of the box, when made, will resemble that shown in picture 3.

Now, we want the centre post, which should be a piece of natural wood from 3 to 5 inches thick and about 3 feet long. It should be sawn off straight across both top and bottom. If there is any difference in the thickness of the wood, we make the thinner end the top. We put the box that we have made on the top of the post, in the centre, and put several good long nails right down into the post. About three nails, each 5 or 6 inches long, will do well enough. Next we put two cross-pieces for a base, checking them in the middle if necessary. These pieces should be about the same thickness as the upright post, but may be a little thinner. Long nails are put right through where these pieces cross up into the bottom of the post. Now we nail on the supporting pieces which join the feet and the post, choosing bent pieces that lend themselves to our purpose; or, if the pieces happen to be straight, we must saw them off at one angle, thereby making it easy to nail them on at the spots where they fit. We can now decorate the outside of the box. We nail split branches, about 1 inch thick, round the top and bottom edges of the

box, and up each of the four corners. The sides of the box we can fill in with smaller split branches, after which we have, at no expense and with little trouble, completed a very presentable piece of garden furniture that will hold a large plant. In picture 2 is shown a box the sides of which are ornamented with pine-cones split in two halves lengthwise, and in picture 4 is seen a box with virgin cork ornamentation. Either of these is easily applied instead of split branches. Before putting a plant into our flower-pot, we ought to put at the bottom a layer of stones, broken bricks, or pieces of broken crockery, as this enables moisture to drain from the roots. No plants are healthy if there is no means by which the water may run away from their roots.

Of course, if we use the flower-stand as described, it must be set in a place where any water that may be dripping through the holes will do no damage. If placed in a tiled conservatory or porch or in the open, it would be all right, but in a drawing-room or living-room it would probably spoil the carpets.

If we want to change the plant frequently, we can put a square-shaped flower-pot inside the flower-stand. Then, when we wish to remove the plant, we simply take out this inside pot and put in another. The last

picture illustrates a rustic chair made of oak branches, the crookedness of which makes them very suitable for chair work. After reading the description of the flower-stand, any boy will be able to make the chair without detailed particulars, and if he is successful in this he may go on to tables, garden seats and even rustic summer-houses, all of which are both picturesque and useful. The best time for work of this sort is in the autumn, when growing wood is drier than at other times, for it then contains much less sap. It must

be remembered that wood with a covering of bark is liable to be the home of insects so that in time the bark falls off as the wood dries. For this reason it is very much better to use wood that has lain exposed until the decayed bark has fallen off. By doing this we avoid the unsightly appearance that rustic work attains when the wood sheds its bark.

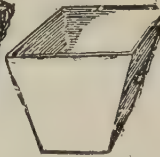
A coat of an insect preventive or a coat of ordinary furniture stain will help to preserve the wood.



1. Rustic flower-stand.



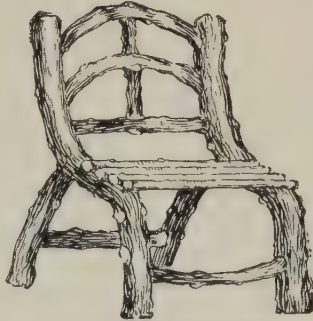
2. Pine-cone decoration.



3. The plain flower-box.



4. Virgin cork decoration.



5. Rustic chair made of rough branches.

THE RIGHT WAY TO MEND THINGS

THERE are many things in use almost every day that get broken, and are then laid aside as useless, although to repair such broken things is really an easy task, if only we knew how to set about it. A few hints will be useful to us, and enable us to mend our broken toys and books and other things and make them almost as fine in appearance as when they were new.

BROKEN TOYS

Accidents happen to toys in spite of the care taken of them; but it is a pity to put them away as useless when they can be mended and made almost as good as new. Glue, tape, string, paint, nails and paper are some of the things we shall require.

Crumpled tin soldiers can be straightened with pincers and freshened with coats of paint; bent tin trains hammered and pressed straight; broken arms of a windmill, loose wheels of carts, legs of furniture belonging to the dolls' house, and numbers of wooden articles mended with glue. If we are at all handy, we shall have no difficulty in soldering substantial metal playthings. Any of these toys when repaired would be welcomed with open arms by the children in hospitals.

TORN MUSIC

Sheets of printed music easily tear round the edges, and a slit once started is apt to end in a page torn in halves. A good way to prevent this, and also to strengthen the margin of the sheet, is to cut a piece of very thin paper the required length and width and paste it on. If a tear occurs across the printed part, we should dip a strip of tissue-paper in white of egg and use that, as the music can be read through it. A reel of transparent adhesive paper, which answers the same purpose, may be had for a few cents. A binding of narrow ribbon will greatly strengthen the back of the damaged music.

A WORN BOOK

The covers of books that have been roughly treated or imperfectly bound often tear away, half the cover usually becoming detached first. The part torn away can be mended by gumming it up the back, strengthening it with linen, and sticking the loosened half of the cover to the first page; but, if the binding be very stiff, thin glue is a better adhesive.

A loose page can be secured by folding a strip of the adhesive paper and sticking one half of it to the loose page and the other half to the next page in the book. This can be repeated on the other side of the page.

A BROKEN SPADE AND BASEBALL BAT

When the stick portion of a wooden spade breaks in two, we should get a thin piece of wood, whalebone or steel, and, placing the broken ends together, bind it along them like a splint, with a piece of twine wound tightly and evenly round and round. A second splint adds strength, but looks clumsy. We can tuck the ends of twine in with a penknife. If the stick breaks off at the blade, the spade

cannot be mended; but if the blade is made of iron, we may burn the wood out of the socket, point the stick, insert it, and fasten it with a nail or screw. A split bat can be mended by binding it tightly with good twine, that should be beeswaxed as it is put on. We must tuck the ends of the twine in very carefully to prevent it from working loose.

TORN BATTLEDORE AND BROKEN DRUM

If the parchment of these toys get punctured and torn, we must remove all the torn part, get a piece of parchment—good typewriter paper will do—cut it to shape, soak it in white of egg, and paste it over the frame of the battledore or drum.

A PUNCTURED CYCLE TIRE

We must partly remove the outer cover of the pneumatic tire, and take out the inner tube. After pumping a little air into the tube, we should listen to locate the puncture. If we cannot find it in this way, we may feel along the surface to discover the escaping air. If this test fails, we must put the tube in a pail of water, when bubbles will rise from the puncture.

We rub the tube with sandpaper about half an inch round the hole, apply a little rubber solution to the place and also to the india-rubber patch to go over the hole. When nearly dry, we stick the patch on, pressing the edges down firmly all round. Then we rub it over with ordinary French chalk and carefully replace the inner tube in position.

A DOLL'S BROKEN HEAD

If the china head of a doll breaks off at the neck, it can be stuck on again with seccotine or glue. Thin glue is suitable for china, wax, composition or wood, and it must be coated along the broken edges. Doll's hair can be stuck on with the same adhesive substance.

BROKEN CHINA AND GLASS

Little ornaments which decorate the mantelpiece sometimes fall and get broken or chipped. Unless they are very badly broken, it is generally worth while mending them, and mending them is often easy.

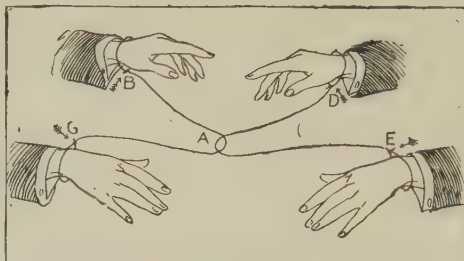
They can be mended with thin glue, which can be squeezed out along the broken edge of the china or glass, or applied to it with a camel's-hair brush. We must place the broken pieces together, and hold them so for a minute or two.

BROKEN UMBRELLAS

If the handle of our umbrella breaks, we may be able to repair it with glue. If this fails, it must be replaced by a new handle. A fresh elastic band and button or tassel, which may be bought quite cheaply, can be sewn on at home. A slit in the cover may be carefully darned and strengthened by a patch of silk on the inside, put on, of course, with the umbrella half closed. It is sometimes possible to straighten a bent tube, but in the case of a broken stick or broken ribs we must take the umbrella to an umbrella-repairer.

TYING TWO PERSONS TOGETHER

A VERY amusing and perplexing trick may be played at an evening party, in which the only apparatus needed is a piece of string that should be divided into two parts, each about a yard in length. Two of the guests are asked to come forward, and the pieces of string are tied upon their wrists in the manner shown in the picture, so that they are fastened together. What they have to do is to release themselves without untying the string at any place, and, of course, without slipping the hand through the loop which has been placed around the wrist.



The prisoners tied together by the wrists.

If the two who have been tied together in this way do not know the trick, they will either very soon give it up, or they will get themselves into a helpless tangle. Yet it is quite simple to effect a release under the conditions named when we know the trick.

The secret is as follows: Take the string at the point A, and, making a loop, pass it

through the loop on the wrist at B in the direction of the arrow. Then pass it over the hand, and the prisoners will find that they are no longer bound together, but can go free. Of course the loop at A can be passed through the loop on the wrist at C and over

that hand, and the result will be the same. Or, making the loop in the other string, we can pass it through the loop at D or E and the partners will be loosed. This is a trick the unraveling of which is not confined to the two persons who are tied together. When they have tried to free themselves and failed, or if they know the

trick, the other members of the party may be invited to release the partners. When the release has been effected, by reversing the process the prisoners may be joined again. In trying this trick we must be careful to put the string at A through the loop on any of the wrists in the direction pointed by the arrows, or the release will not be effected.

KEEPING GUINEA-PIGS AS PETS

GUINEA-PIGS are always very interesting pets for boys and girls to keep. The proper name of the clean little pet that we know as the guinea-pig is the cavy. But we seldom speak of cavies, and nearly always of guinea-pigs. It is difficult to understand how the name of guinea-pig came to be applied to the animal. It never at any time came from Guinea, which is in Africa, nor from New Guinea, the large island north of Australia. Also it is singularly unlike a pig. The name may have been taken from Guiana, a country adjacent to Brazil, where some of the animals have been found.

The sort of hutch that serves to keep rabbits will do equally well for guinea-pigs. Their manner of life and the food that appeals to them are very much the same.

Rabbits and guinea-pigs are often kept together and do very well, but we may as well know that the reason some people give for keeping guinea-pigs with rabbits is based on an entirely false impression. It is supposed that guinea-pigs keep rats away from the rabbit-hutch, and many boys know from sad experience that rats do not hesitate to eat very young rabbits if they get the chance. Rabbits breed at the age of six months, from four to eight times a year, and the litters consist of from three to eight young.

Guinea-pigs may be purchased from any dealer in animal pets. The price paid for an ordinary short-haired pair is usually about a half dollar, or even less. Fancy guinea-pigs, such as the long-haired Peruvian breed, cost, as a rule, four or five times as much. The hut or hutch in which the pets are to stay should be warm and dry, just as for rabbits,

and there should be plenty of warm bedding, such as dry hay, which should be renewed frequently, so as to keep the little house sweet and clean. The animals are very clean themselves, and the hutch should be cleaned out regularly every day. The dishes from which they feed should be washed every morning, and all scraps of food that remain uneaten should be taken away at the same time. They should also be provided with a dish of clean water.

The food of the guinea-pig is similar to that of the rabbit. They eat dandelions and fresh vegetables, roots, such as carrots and turnips, and they like bread and milk. We should give them as much food as they can eat, but if we find that they eat every particle of food that we give them, we may conclude that we have not been giving enough.

Guinea-pigs begin to have young very early, when about two months old. The young ones come in litters of three to five, and one father and mother may have about five litters in a year. It has been calculated that under the most favorable conditions one pair of guinea-pigs might increase to about a thousand in a single year.

When the young guinea-pigs come, they are pretty little creatures, well covered with fur, and with open eyes. They begin to eat the same food as their father and mother the day after they are born, and in about two months they may have young of their own. In winter the hutch with the guinea-pigs should be placed indoors, and care in regard to feeding, and attention in regard to cleaning, should never be slackened.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 4845.

A BALLAD OF THE FLEET

THERE are few tales of heroism to compare with that of Sir Richard Grenville, one of the brave sailors of Queen Elizabeth's day. In August, 1591, when he was commanding the *Revenge* in Lord Thomas Howard's squadron, they fell in with a great Spanish fleet of fifty-three vessels off the Azores Islands in mid-Atlantic. The admiral made his escape with five vessels, but Sir Richard Grenville refused to show flight before the hated Spaniards. Certain death was the prospect of engaging their great fleet with his one little vessel, but he fought from three in the afternoon until next morning so gallantly that fifteen of the great Spanish men-of-war were beaten off, two of them were sunk, and two more disabled. Some two thousand Spanish sailors were killed or drowned before Sir Richard, fatally wounded, gave in. The poem is by Lord Tennyson.

THE REVENGE



AT Flores in the
Azores Sir Rich-
ard Grenville lay,
And a pinnace, like a
flutter'd bird, came
flying from far away:
"Spanish ships of war at sea! we
have sighted fifty-three!"
Then spake Lord Thomas Howard:
"Fore God I am no coward;
But I cannot meet them here, for my ships
are out of gear,
And the half my men are sick. I must fly,
but follow quick.
We are six ships of the line; can we fight
with fifty-three?"
Then spake Sir Richard Grenville: "I
know you are no coward;
You fly them for a moment to fight with
them again.
But I've ninety men and more that are
lying sick ashore.
I should count myself the coward if I left
them, my Lord Howard,
To these Inquisition dogs and the devil-
doms of Spain."
So Lord Howard passed away with five
ships of war that day,
Till he melted like a cloud in the silent
summer heaven;
But Sir Richard bore in hand all his sick
men from the land
Very carefully and slow,
Men of Bideford in Devon,
And we laid them on the ballast down be-
low;
For we brought them all aboard,
And they blest him in their pain, that they
were not left to Spain,
To the thumbscrew and the stake, for the
glory of the Lord.
He had only a hundred seamen to work
the ship and to fight,
And he sail'd away from Flores till the
Spaniard came in sight,
With his huge sea-castles heaving upon
the weather bow.

"Shall we fight or shall
we fly?
Good Sir Richard, tell
us now,
For to fight is but to
die!

There'll be little of us left by the
time this sun be set."
And Sir Richard said again: "We
be all good English men;
Let us bang these dogs of Seville, the
children of the devil,
For I never turned my back upon Don
or devil yet."
Sir Richard spoke and he laugh'd, and we
roar'd a hurrah, and so
The little *Revenge* ran on sheer into the
heart of the foe,
With her hundred fighters on deck, and
her ninety sick below;
For half of their fleet to the right and half
to the left were seen,
And the little *Revenge* ran on thro' the
long sea-lane between.
Thousands of their soldiers look'd down
from their decks and laugh'd,
Thousands of their seamen made mock at
the mad little craft
Running on and on, till delay'd
By their mountain-like San Philip that, of
fifteen hundred tons,
And up-shadowing high above us with her
yawning tiers of guns,
Took the breath from our sails, and we
stay'd.
And while now the great San Philip hung
above us like a cloud
Whence the thunderbolt will fall
Long and loud,
Four galleons drew away
From the Spanish fleet that day,
And two upon the larboard and two upon
the starboard lay,
And the battle-thunder broke from them all.
And the sun went down, and the stars
came out far over the summer sea,

But never a moment ceased the fight of the
one and fifty-three.
Ship after ship, the whole night long, their
high-built galleons came.
Ship after ship, the whole night long, with
her battle-thunder and flame;
Ship after ship, the whole night long, drew
back with her dead and her shame.
For some were sunk and many were shatter'd,
and so could fight us no more—
God of battles, was ever a battle like this in
the world before?
For he said: "Fight on! fight on!"
Tho' his vessel was all but a wreck;
And it chanced that, when half of the short
summer night was gone,
With a grisly wound to be dressed he had left
the deck,
But a bullet struck him that was dressing it
suddenly dead,
And himself he was wounded again in the
side and the head,
And he said: "Fight on! fight on!"
And the night went down, and the sun smiled
out far over the summer sea,
And the Spanish fleet with broken sides lay
round us, all in a ring;
But they dared not touch us again, for they
fear'd that we still could sting,
So they watch'd what the end would be.
And we had not fought them in vain,
But in perilous plight were we,
Seeing forty of our poor hundred were slain,
And half of the rest of us were maim'd for life
In the crash of the cannonades and the des-
perate strife;
And the sick men down in the hold were most
of them stark and cold,
And the pikes were all broken and bent, and
the powder was all of it spent;
And the masts and the rigging were lying
over the side;
But Sir Richard cried in his English pride:
"We have fought such a fight for a day and
a night
As may never be fought again!
We have won great glory, my men!
And a day less or more
At sea or ashore,
We die—does it matter when?
Sink the ship, Master Gunner—sink her, split
her in twain!
Fall into the hands of God, not into the hands
of Spain!"
And the gunner said: "Ay, ay," but the sea-
men made reply:
"We have children, we have wives,
And the Lord hath spared our lives.
We will make the Spaniard promise, if we
yield, to let us go;
We shall live to fight again and to strike an-
other blow."
And the lion there lay dying, and they yielded
to the foe.
And the stately Spanish men to their flagship
bore him then,
Where they laid him by the mast, old Sir
Richard caught at last,
And they praised him to his face with their
courtly foreign grace;

But he rose upon their decks, and he cried:
"I have fought for Queen and Faith, like a
valiant man and true;
I have only done my duty as a man is bound
to do;
With a joyful spirit, I Sir Richard Grenville
die!"
And he fell upon their decks, and he died.
And they stared at the dead that had been so
valiant and true,
And had holden the power and glory of Spain
so cheap
That he dared her with one little ship and his
English few;
Was he devil or man? He was devil for
aught they knew,
But they sank his body with honour down
into the deep,
And they mann'd the Revenge with a swarth-
ier alien crew,
And away she sail'd with her loss and long'd
for her own;
When a wind from the lands they had ruin'd
awoke from sleep,
And the water began to heave and the
weather to moan,
And ere ever that evening ended a great gale
blew,
And a wave like the wave that is raised by an
earthquake grew,
Till it smote on their hulls and their sails and
their masts and their flags,
And the whole sea plunged and fell on the
shot-shatter'd navy of Spain,
And the little Revenge herself went down by
the island crags
To be lost evermore in the main.

FAITH

This hymn, a favorite in all churches, has been trans-
lated into twenty languages. Ray Palmer was the
author.

MY faith looks up to Thee,
Thou Lamb of Calvary,
Saviour divine!
Now hear me while I pray,
Take all my guilt away,
O let me from this day
Be wholly Thine!

May Thy rich grace impart
Strength to my fainting heart,
My zeal inspire;
As Thou hast died for me,
O may my love for Thee
Pure, warm, and changeless be,—
A living fire!

While life's dark maze I tread,
And griefs around me spread,
Be Thou my guide;
Bid darkness turn to day,
Wipe sorrow's tears away,
Nor let me ever stray
From Thee aside.

When ends life's transient dream,
When death's cold, sullen stream
Shall o'er me roll:
Blest Saviour, then, in love,
Fear and distrust remove;
O bear me safe above,
A ransomed soul!

THE BOY AND THE ANGEL

Robert Browning seeks to illustrate in this poem one of the greatest truths of life. The poor boy Theocrite, sincerely praising God each day, foolishly comes to think that God would be better pleased to be praised in the "great way" of the Pope of Rome, and so his ambition is to be Pope. The poet imagines the angel Gabriel coming down to earth to take the place of the poor workman Theocrite, while Theocrite becomes the Pope. But God missed the voice of his humble worker. He would as soon have the praise of the workman at his bench as that of the mightiest potentate. We are all free to praise God in our own way.

MORNING, evening, noon and night,

"Praise God!" sang Theocrite.

Then to his poor trade he turned,
By which the daily meal was earned.
Hard he laboured, long and well;
O'er his work the boy's curls fell.
But ever, at each period,
He stopped and sang: "Praise God!"
Then back again his curls he threw,
And cheerful turned to work anew.
Said Blaise, the listening monk: "Well done;
I doubt not thou art heard, my son:
"As well as if thy voice to-day
Were praising God the Pope's great way.
"This Easter Day, the Pope at Rome
Praises God from Peter's dome."
Said Theocrite: "Would God that I
Might praise him that great way, and die!"
Night passed, day shone,
And Theocrite was gone.
With God a day endures alway,
A thousand years are but a day.
God said in heaven: "Nor day nor night
Now brings the voice of my delight."
Then Gabriel like a rainbow's birth,
Spread his wings and sank to earth;
Entered, in flesh, the empty cell,
Lived there, and played the craftsman well.
And morning, evening, noon, and night,
Praised God in place of Theocrite.
And from a boy to youth he grew
The man put off the stripling's hue.
The man matured and fell away
Into the season of decay;
And ever o'er the trade he bent,
And ever lived on earth content.
(He did God's will; to him, all one
If on the earth or in the sun.)
God said: "A praise is in mine ear;
There is no doubt in it, no fear:

"So sing old worlds, and so
New worlds that from my footstool go:

"Clearer loves sound other ways:
I miss my little human praise."

Then forth sprang Gabriel's wings, off fell
The flesh disguise, remained the cell.

'Twas Easter Day: he flew to Rome,
And paused above Saint Peter's dome.

In the tiring-room close by
The great outer gallery,
With his holy vestments dight,
Stood the new Pope, Theocrite;

And all his past career
Came back upon him clear,

Since when, a boy, he plied his trade,
Till on his life the sickness weighed;

And in his cell, when death drew near,
An angel in a dream brought cheer;

And rising from the sickness drear
He grew a priest, and now stood here.

To the East with praise he turned,
And on his sight the angel burned.

"I bore thee from thy craftsman's cell
And set thee here; I did not well.

"Vainly I left my angel's sphere,
Vain was thy dream of many a year.

"Thy voice's praise seemed weak; it dropped—
Creation's chorus stopped!

"Go back and praise again
The early way, while I remain.

"With that weak voice of our disdain,
Take up creation's pausing strain.

"Back to the cell and poor employ:
Become the craftsman and the boy!"

Theocrite grew old at home;
A new pope dwelt in Peter's dome.

One vanished as the other died:
They sought God side by side.

AN EVENING HYMN

One of the most beautiful evening hymns is the following, written by the Rev. James Drummond Burns, a Scottish minister who was born in 1823 and died at Mentone in 1864. Samuel was one of the great prophets of Israel, and his qualities of mind and heart are described.

HUSHED was the evening hymn,

The temple courts were dark;

The lamp was burning dim

Before the sacred ark,

When suddenly a voice divine

Rang through the silence of the shrine.

Oh, give me Samuel's ear—

The open ear, O Lord!

Alive and quick to hear

Each whisper of Thy word;

Like him to answer at Thy call,

And to obey Thee first of all.

Oh, give me Samuel's heart!

A lowly heart, that waits

When in Thy house Thou art;

Or watches at Thy gates

By day and night—a heart that still

Moves at the breathing of Thy will.

Oh, give me Samuel's mind!

A sweet, unurm'ring faith,

Obedient and resigned

To Thee in life and death:

That I may read, with child-like eyes,

Truths that are hidden from the wise.

A NAME IN THE SAND

Hannah Flagg Gould was a very popular writer of verse in America about the middle of last century, her themes being chosen chiefly from humble walks of life. Her aim was always to illustrate some "moral," as she does very simply and effectively in the following poem.

ALONE I walked the ocean strand;
A pearly shell was in my hand:
I stooped and wrote upon the sand
My name—the year—the day.
As onward from the spot I passed,
One lingering look behind I cast;
A wave came rolling high and fast,
And washed my lines away.

And so, methought, 'twill shortly be
With every mark on earth from me:
A wave of dark oblivion's sea
Will sweep across the place
Where I have trod the sandy shore
Of time, and been, to be no more,
Of me—my day—the name I bore,
To leave nor track nor trace.

And yet, with Him who counts the sands
And holds the waters in His hands
I know a lasting record stands
Inscribed against my name,
Of all this mortal part has wrought,
Of all this thinking soul has thought,
And from these fleeing moments caught
For glory or for shame.

THE BARON'S LAST BANQUET

Albert Gorton Greene was a minor American poet, born in 1802, whose best-known poem is given here. In spirited verse it retells an old legend of a warrior-baron who had so long overcome his enemies that he could scarce believe his greatest enemy of all, grim Death, had laid hands on him.

O'ER a low couch the setting sun had
thrown its latest ray,
Where in his last strong agony a dying war-
rior lay,
The stern old Baron Rudiger, whose frame
had ne'er been bent
By wasting pain, till time and toil its iron
strength had spent.

"They come around me here, and say my
days of life are o'er,
That I shall mount my noble steed and lead
my band no more;
They come, and to my beard they dare to
tell me now, that I,
Their own liege lord and master born,—that
I, ha, ha! must die.

"And what is Death? I've dared him oft
before the Paynim spear,—
Think ye he's entered at my gate, has come
to seek me here?
I've met him, faced him, scorned him, when
the fight was raging hot,—
I'll try his might—I'll brave his power; defy,
and fear him not.

"Ho! sound the tocsin from my tower, and
fire the culverin,—
Bid each retainer arm with speed,—call every
vassal in;
Up with my banner on the wall,—the ban-
quet board prepare;
Throw wide the portal of my hall, and bring
my armor there!"

An hundred hands were busy then—the ban-
quet forth was spread—
And rung the heavy oaken floor with many a
martial tread,
While from the rich, dark tracery along the
vaulted wall,
Lights gleamed on harness, plume, and spear,
o'er the proud old Gothic hall.

Fast hurrying through the outer gate the
mailed retainers poured,
On through the portal's frowning arch, and
thronged around the board,
While at its head, within his dark, carved
oaken chair of state,
Armed cap-à-pie, stern Rudiger, with girded
falchion, sate.

"Fill every beaker up, my men, pour forth
the cheering wine;
There's life and strength in every drop,—
thanksgiving to the vine!
Are ye all there, my vassals, true?—mine
eyes are waxing dim;
Fill round, my tried and fearless ones, each
goblet to the brim.

"You're there, but yet I see ye not. Draw
forth each trusty sword
And let me hear your faithful steel clash once
around my board;
I hear it faintly—louder yet!—What clogs
my heavy breath?
Up all, and shout for Rudiger, 'Defiance unto
Death!'"

Bowl rang to bowl—steel clang to steel—and
rose a deafening cry
That made the torches flare around, and
shook the flags on high:—
"Ho, cravens, do ye fear him?—Slaves, trait-
tors, have ye flown?
Ho, cowards, have ye left me to meet him
here alone?

"But I defy him:—let him come!" Down
rang the massy cup,
While from its sheath the ready blade came
flashing halfway up;
And with the black and heavy plumes scarce
trembling on his head,
There in his dark, carved oaken chair old
Rudiger sat—dead!

JESUS, TENDER SHEPHERD

This beautiful poem is an evening prayer in verse, and was written many years ago by Mary Lundie Duncan, the author of *Rhymes for My Children*. She is remembered as much for her quiet, useful life as for her poetry.

JESUS, tender Shepherd, hear me,
Bless Thy little lamb to-night;
Through the darkness be Thou near me,
Keep me safe till morning light.

Through this day Thine hand has led me,
And I thank Thee for Thy care;
Thou has warmed me, clothed, and fed me,
Listen to my evening prayer.

Let my sins be all forgiven,
Bless the friends I love so well;
Take me, when I die, to heaven,
Happy, there with Thee to dwell.

A WOMAN'S SHORTCOMINGS

Most of Elizabeth Barrett Browning's poems have a depth of feeling and beauty of rhythm unsurpassed by those of any other woman poet. Although almost all her poetry was written for grown-ups, still a child can enjoy it.

SHE has laughed as softly as if she sighed,
She has counted six, and over,

Of a purse well filled, and a heart well tried—
Oh, each a worthy lover!

They "give her time"; for her soul must slip
Where the world has set the grooving;

She will lie to none with her fair red lip:
But love seeks truer loving.

She trembles her fan in sweetness dumb,
As her thoughts were beyond recalling;

With a glance for *one*, and a glance for *some*,
From her eyelids rising and falling;

Speaks common words with a blushing air,
Hears bold words, unrepining;

But her silence says—what she never will
swear—

And love seeks better loving.

Go, lady, lean to the night guitar,
And drop a smile to the bringer;

Then smile as sweetly, when he is far,
At the voice of an indoor singer.

Bask tenderly beneath tender eyes,
Glance lightly, on their removing;

And join new vows to old perjuries—
But dare not call it loving!

Unless you can think, when the song is done,
No other is soft in the rhythm;

Unless you can feel, when left by One,
That all men else go with him;

Unless you can know, when unpraised by his
breath,

That your beauty itself wants proving;
Unless you can swear "For life, for death!"—

Oh, fear to call it loving!

Unless you can muse in a crowd all day
On the absent face that fixed you;

Unless you can love, as the angels may,
With the breadth of heaven betwixt you;

Unless you can dream that his faith is fast,
Though behaving and unbehaving;

Unless you can *die* when the dream is past—
Oh, never call it loving!

THE TEST

Emerson here suggests—as is indeed true—that Time will at last winnow all the lines of the poets until only the sound and the true remain—five lines from five hundred, it may be. By constant search wise readers and critics seek to find from the poets of all the ages those few deathless lines.

I HUNG my verses in the wind,
Time and tide their faults may find.

All were winnowed through and through,
Five lines lasted sound and true;

Five were smelted in a pot
Than the South more fierce and hot;

These the siroc could not melt,
Fire their fiercer flaming felt,

And the meaning was more white
Than July's meridian light.

Sunshine cannot bleach the snow,
Nor time unmake what poets know.

Have you eyes to find the five
Which five hundred did survive?

THE MOUSE AND THE CAKE

Eliza Cook was notable in her day as a writer of popular verse of a pure and elevating character. In the following poem from her pen we have one of the most familiar type of fables, the "moral" of which is so plain that not even the youngest will need to have it pointed out. It is, however, a moral not readily accepted, and for that reason there is perhaps need to keep the little poem in circulation.

A MOUSE found a beautiful piece of plum-
cake,

The richest and sweetest that mortal could
make;

'Twas heavy with citron and fragrant with
spice,

And covered with sugar all sparkling as ice.

"My stars!" cried the mouse, while his eye
beamed with glee,

"Here's a treasure I've found. What a feast
it will be!

But hark! there's a noise! 'Tis my brothers
at play;

So I'll hide with the cake, lest they wander
this way.

"Not a bit shall they have, for I know I can
eat

Every morsel myself, and I'll have such a
treat!"

So off went the mouse, as he held the cake
fast;

While his hungry young brothers went
scampering past.

He nibbled and nibbled, and panted; but still
He kept gulping it down till he made himself

ill;

Yet he swallowed it all, and, 'tis easy to
guess,

He was soon so unwell that he groaned with
distress.

His family heard him, and as he grew worse,
They sent for the doctor, who made him re-
hearse

How he'd eaten the cake to the very last
crumb,

Without giving his playmates and relatives
some.

"Ah me!" cried the doctor, "advice is too
late;

You must die before long, so prepare for your
fate.

If you had but divided the cake with your
brothers,

'Twould have done you no harm, and been
good for the others.

"Had you shared it, the treat would have been
wholesome enough;

But eaten by *one*, it was dangerous stuff;
So prepare for the worst."

And the word
had scarce fled,

When the doctor turned round, and the
patient was dead.

Now all little people the lesson may take,
And *some* large ones may learn from the

mouse and the cake,
Not to be over-selfish with what we may

gain,
Or the best of our pleasures may turn into

pain.

THE ARROW AND THE SONG

In these famous verses by Henry W. Longfellow, the poet's object is to illustrate a great truth, which, if we but bear it in mind, will very seriously affect our lives and conduct. Nothing that we do, nothing that we think or say is done in vain. Just as the arrow shot in the air will somewhere fall to earth, so the deeds we do and the thoughts we express will make their marks perhaps on the lives of others, unseen by us, and will unconsciously affect our own lives as well.

I SHOT an arrow into the air,
It fell to earth, I knew not where;
For, so swiftly it flew, the sight
Could not follow it in its flight.

I breathed a song into the air,
It fell to earth, I knew not where;
For who has sight so keen and strong,
That it can follow the flight of song?

Long, long afterward, in an oak
I found the arrow, still unbroke;
And the song, from beginning to end,
I found again in the heart of a friend.

BIRDS IN SUMMER

This is one of the poetical pieces of Mary Howitt. Although it does not rank high as poetry, there is a bright truthfulness in its effort to picture the winged freedom of the birds. It may be interesting to add that the verses are sometimes attributed to Mrs. Hemans, but we think it is much more probable that they were written by Mrs. Howitt.

HOW pleasant the life of a bird must be,
Flitting about in each leafy tree;
In the leafy trees, so broad and tall,
Like a green and beautiful palace-hall,
With its airy chambers, light and boon,
That open to sun, and stars, and moon;
That open unto the bright blue sky,
And the frolicsome winds as they wander by!

They have left their nests on the forest-bough,
Those homes of delight they need not now;
And the young and the old they wander out,
And traverse their green world round about,
And hark! at the top of this leafy hall,
How one to the other in love they call:
"Come up! Come up!" they seem to say,
"Where the topmost twigs in the breezes
sway.

"Come up! come up! for the world is fair
Where the merry leaves dance in the summer
air."

And the birds below give back the cry:
"We come, we come to the branches high."
How pleasant the lives of the birds must be,
Living in love in a leafy tree!
And, away through the air, what joy to go;
And to look on the green, bright earth below!

How pleasant the life of a bird must be,
Skimming about on the breezy sea,
Cresting the billows like silvery foam,
Then wheeling away to its cliff-built home!
What joy it must be to sail, upborne
By a strong, free wing, through the rosy
morn;
To meet the young sun face to face,
And pierce like a shaft the boundless space;
To pass through the bower of the silver
cloud;
To sing in the thunder-halls aloud;

To spread out the wings for a wild-free flight
With the upper cloud-winds—oh, what de-
light!

Oh, what would I give, like a bird, to go,
Right on through the arch of the sunlit bow,
And see how the water-drops are kissed
Into green and yellow and amethyst!

How pleasant the life of a bird must be,
Wherever it listeth there to flee;
To go, when a joyful fancy calls,
Dashing adown 'mong the waterfalls;
Then to wheel about with their mates at
play,
Above and below and among the spray,
Hither and thither, with screams as wild
As the laughing mirth of a rosy child!

What joy it must be, like a living breeze,
To flutter about 'mid the flowering trees;
Lightly to soar, and to see beneath
The wastes of the blossoming purple heath,
And the yellow furze, like fields of gold,
That gladdened some fairy region old!
On mountain-tops, on the billowy sea,
On the leafy stems of the forest-tree,
How pleasant the life of a bird must be!

COMMON THINGS

The praise of common things, the romance and beauty that dwell in them, and how they may be favorably contrasted with the rich and rare things for which we so often vainly sigh, are very frequent themes with the poets of all lands. These verses by Mrs. Hawshawe do not rank high as poetry, but their good sense is apparent.

THE sun is a glorious thing,
That comes alike to all;
Lighting the peasant's lowly cot,
The noble's painted hall.

The moonlight is a gentle thing,
Which through the window gleams
Upon the snowy pillow where
The happy infant dreams.

It shines upon the fisher's boat,
Out on the lovely sea;
Or where the little lambkins lie,
Beneath the old oak-tree.

The dewdrops on the summer morn,
Sparkle upon the grass;
The village children brush them off,
That through the meadow pass.

There are no gems in monarch's crowns
More beautiful than they;
And yet we scarcely notice them,
But tread them off in play.

Poor robin on the pear-tree sings,
Beside the cottage door;
The heath-flower fills the air with sweets
Upon the pathless moor.

There are as many lovely things
As many pleasant tones,
For those who sit by cottage hearths
As those who sit on thrones!

LITTLE VERSES FOR VERY LITTLE PEOPLE

WHEN the snow is on the ground,
Little Robin Redbreast grieves;
For no berries can be found,
And on the trees there are no leaves.



The air is cold, the worms are hid;
For this poor bird what can be done?
We'll strew him here some crumbs of
bread,
And then he'll live till the snow is
gone.

“WILLY boy, Willy boy, where are
you going?
I will go with you, if that I may.”
“I’m going to the meadow to see them
a-mowing,
I’m going to help them make the hay.”

NOW what do you think
Of little Jack Jingle?
Before he was married
He used to live single.

THE gossips of the village—see,
Their fine lace caps are wearing.
They sip their dainty cups of tea,
White sugar they are sharing.



Their fingers shine with golden rings,
But—duty never matters!
Nothing is ready for the men,
And under—they are tatters!

HUSH-A-BYE, babby, lie still with thy
daddy,
Thy mammy is gone to the mill
To get some wheat, to make some meat,
So pray, my dear babby, lie still.

A DUCK and a drake,
And a nice barley cake,
With a penny to pay the old baker;
A hop and a scotch
Is another notch,
Slitherum, slatherum, take her!

PUSSY sits beside the fire,
How can she be fair?
In comes the little dog,
“Pussy, are you there?
So, so, Mistress Pussy,
Pray, how do you do?”
“Thank you, thank you, little dog,
I’m very well just now.”

THE white dove sat on the castle wall,
I bent my bow and made her fall;



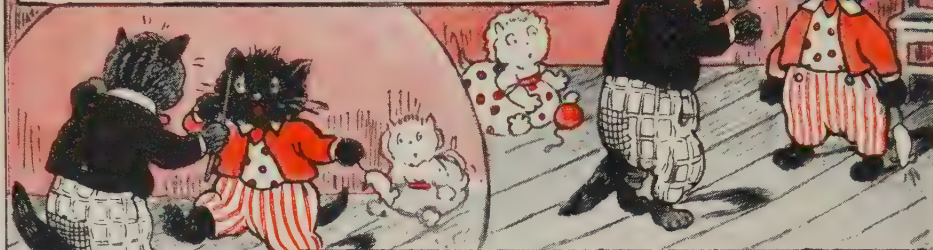
I picked her up, feathers and all,
And I rode away from the castle wall.

“LEND me thy mare to go a mile.”
“She is lamed, leaping over a stile.”
“Alack, and I must keep the fair—
I’ll give thee money for thy mare.”
“Oh, oh, say you so!
Money will make the mare to go.”

HE loves me, he don’t!
He’ll have me, he won’t!
He would if he could,
But he can’t, so he don’t!

I LOVE you well, my little brother,
And you are fond of me;
Let us be kind to one another,
As brothers ought to be.
You shall learn to play with me,
And learn to use my toys;
And then I think that we shall be
Two happy little boys.

Two little kittens, one stormy night,
Began to quarrel and then to fight;
One had a mouse and the other had none,
And that's the way the quarrel begun.



"I'll have that mouse," said the biggest cat.
"You'll have that mouse? we'll see about that!"
"I will have that mouse," said the eldest son.
"You sha'n't have the mouse," said the little one.

I told you before 'twas a stormy night,
When these two little kittens began to fight;
The old woman seized her sweeping broom,
And swept the two kittens right out of the room.

The ground was covered with frost and snow,
And the two little kittens had nowhere to go;
So they laid them down on the mat at the door,
While the old woman finished sweeping the floor.



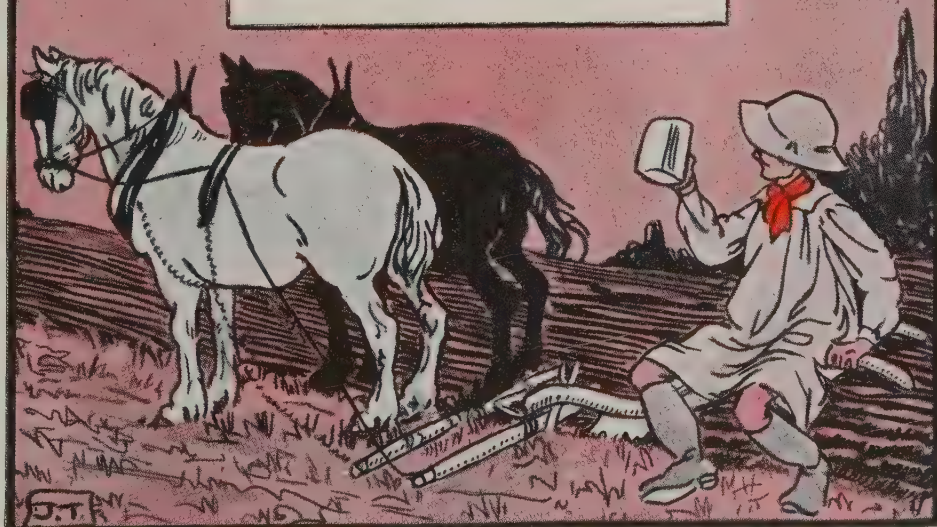
Then they crept in, as quiet as mice,
All wet with the snow, and as cold as ice;
For they found it was better, that stormy night,
To lie down and sleep than to quarrel and fight.



Wassail! Wassail all over the town,
Our toast it is white, our ale it is brown,
Our bowl it is made of the good mapletree;
We be good fellows all—and I drink to thee.

Here's to Grey Dobbin, and to his right ear,
God send our master a happy new year!
A happy new year as e'er he did see,
With my wassailing-bowl I drink to thee.

Here's to Black Beauty, and to his right eye,
God send our mistress a good Christmas pie;
A good Christmas pie as e'er I did see—
With my wassailing-bowl I drink to thee.



THE PRINCE GOES ON HIS TRAVELS



Five servants helped the Prince to win the Princess: the tall man, the fat man, the man with wonderful ears, the man with wonderful eyes, and the man who shivered in summer and was hot in winter.



THE PRINCE'S FIVE SERVANTS

MANY, many years ago there lived a beautiful Princess, who was so charming that everyone loved her. But, in spite of all the love and admiration that was showered upon her, the Princess was not happy, for she had a cruel mother, who never seemed so happy as when she was making others miserable.

It can easily be understood that with such a Queen the palace was by no means the most agreeable place to live in, and the Princess eagerly looked forward to the day when some brave Prince would fall in love with her, and take her away to a home of her own. But, alas! no sooner did a suitor appear than the old Queen set him, as the price of her daughter's hand, some impossible task, on the understanding that failure should mean death; and so the poor man lost not only his bride, but his head as well.

One day when the Princess was walking in the forest with her maids, idly wondering whether there could be another being in the whole wide world so wretched as she was, a handsome Prince rode by.

"What a lovely girl!" thought the Prince; and he watched her till she passed out of sight.

Now, the Prince had fallen in love with the Princess at first sight, and he determined to win her. Losing no time, he set out the next day for the

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palace. On the outskirts of a wood, through which he had to pass on his way, he noticed what he thought to be a huge beast lying by the wayside. But, on going nearer, he found that it was no beast, but a man—the biggest man he had ever seen.

He touched him on the shoulder, and the man stood up and asked: "Do you need a servant?"

"If I did," returned the Prince, "I don't know what I should do with such a great fat fellow as you."

"What does my size matter," answered the man, "so long as I discharge my duties faithfully?"

This answer pleased the Prince so much that he engaged the man on the spot. When they had gone along a little farther, the Prince came across a man who lay on the grass with his ear close to the ground.

"What are you doing?" asked the Prince.

"Listening," said the man. "I can hear all that goes on in the world."

"You may be valuable to me some day," said the Prince. "Follow me."

Before they had gone very far they came across a pair of feet, and, a little farther on, a pair of legs; and then they found a body; and then, at last, the head.

"Bless me," exclaimed the Prince, "what an extraordinary man!"

"Oh," replied the man, "this is

nothing to what I can do when I stretch myself to my full height! When I choose, I can make myself three times as tall as the highest mountain."

"Follow me," said the Prince. "Some day you may be of service."

Then an extraordinary thing happened. The man muttered some words and in an instant he shrank to the size of an ordinary man.

This strange little band journeyed on till they came upon a man who shivered with cold, though he sat in the blazing sunshine.

"Are you ill that you shiver in this heat?" inquired the Prince kindly.

"Indeed," answered the man, "something must be wrong with me, for the sun, instead of warming me, sends cold thrills over me; while the cold and ice of winter oppress me so that I often faint as from heat!"

"How very extraordinary!" said the Prince. "Still, as you seem to have nothing to do, follow me, and I will take you into my service."

A little farther on they found a man who was standing on tiptoe, eagerly scanning the land.

"For what are you looking?" asked the Prince.

"I am watching the world," replied the man. "My eyes are so sharp that I can see from end to end. If you need a servant, you may find me very useful."

"True," said the Prince. "Follow me."

When they arrived at the palace, the Prince was shown before the Queen, from whom he begged the hand of the lovely Princess.

"The man who would win her," replied the old Queen, "must earn her."

The Prince was prepared for this, and asked what his task was to be.

"There are three," replied the Queen. "First, bring me the ring that I dropped in the Red Sea."

"That is simple," said the man who could make himself as tall as the highest mountain.

"Why, there it is!" exclaimed the sharp-eyed man, "just by that green rock." Whereupon the tall man stretched himself to his full length, bent over, and picked it up.

The Queen was furious when the Prince handed her the ring, although she pretended to be pleased.

"You have indeed done well," said

she; "but you may not find your second task so easy. Yonder are a hundred fat oxen: these you must eat before noon. And in a cellar below are one hundred casks of wine: these you must empty so that not a drop remains."

"May I invite a guest?" asked the Prince.

"Certainly," replied the Queen, with a spiteful laugh. "One, and one only."

The Prince turned and found the fat man at his side.

"Just leave this to me, Master," said the man, well pleased at the prospect. And by noon nothing remained of the feast but a hundred empty wine-casks and a pile of bones.

This time the Queen could scarcely hide her anger.

"Your third task you may find more difficult to perform," she said. "At sunset I shall bring my daughter to your apartments and leave her in your care. See to it that she is still there when I return at midnight."

"That does not sound impossible," thought the Prince; "with the help of my five servants I think I can manage to keep the Princess."

At dusk the Princess arrived. The Prince led her to a low-cushioned seat by the window, and the Queen went away. As the door closed behind her the Prince clapped his hands, and immediately his servants made silent preparations for the watch. The tall man stretched himself to his full length, and wound himself round and round the little house, so that none could go in nor pass out; the sharp-eyed man closely watched the movements of the Queen; while the man with the wonderful hearing remained motionless with his ear to the ground.

Within the room all was silence. The moon streamed through the open window on the face of the lovely Princess, who sat with folded hands gazing idly at the stars; and behind, his face in shadow, stood the Prince watching her, and wondering at her exquisite beauty.

But suddenly, as the clock struck eleven, the old Queen threw a spell over them, so that they all fell asleep; and while they slept the Princess vanished. But, clever as she was, the old Queen had no powers of enchantment after a quarter to twelve, and as the clock chimed they all awoke, and the Prince started to his feet.

"Alas, alas!" he cried, "my beautiful lady is gone! All is lost, lost!"

"Not so," cried the man with the wonderful ears. "I hear her weeping, but the sound comes from afar."

"I see her seated on an enchanted rock three hundred miles away," cried the sharp-eyed man.

"Describe the place," said the tall man, "and I will bring her here in three minutes."

When the old Queen came back at twelve o'clock, she was amazed to find her daughter sitting just where she had left her.

"Take her; you have won your bride," she said to the Prince.

But as she passed she whispered to the Princess: "I would scorn to be won by a pack of servants."

The idea was so displeasing to the pride of the Princess that she turned to the Prince and said: "Before you can win *my* consent, one of your wonderful servants must consent to be flung on a pile of three hundred burning logs of wood, and there remain till the fire has quite burned out."

"You hear," said the Prince to his servants. "Will any of you consent?"

"I will," answered the frosty man, stepping forward without any hesitation.

So the logs were brought, and the fire started; and for three whole days the court watched the man as he lay shivering and shaking with cold on the burning pile. When the last flame had flickered out, and the glowing embers had turned gray, the frosty man rose to his feet and said that he had never felt so cold in his life.

The Princess was delighted that her handsome lover had once more triumphed. She held out her hand, and the Prince bent down and kissed it.

Now that the old Queen no longer had any excuse for delay, the bridal day was fixed, and the wedding took place amid scenes of great enthusiasm, for the Princess was much loved by her people, and the Prince had shown himself to be as clever as he was handsome.

After the ceremony, the Princess arrayed herself in her finest dress and her most costly jewels, and together she and the Prince set out for his palace. Here they were received with great kindness by the old King and Queen, and they lived very happily together all the rest of their lives.

HOW THE BAD NEWS

THERE is a good story told of that strange personage Frederick the Great of Prussia. He had a good knowledge of French and a taste for literature and music. He was very loyal to his mother and much attached to his sister Wilhelmina, and usually very kind-hearted. Sometimes, however, his temper got the best of him and he was hasty in his words.

To one creature he was most passionately devoted, and this was a horse. It was a handsome charger, fit for a king to ride upon, and so intelligent and affectionate that it quite softened and won the heart of its royal master.

One day, when he was very much put out and busy, he learned that this favorite was ill. In a fit of petulant rage, feeling his own insignificance at not being able to keep even a horse alive, though he was a great monarch, he called out that any man who should inform him that the horse was dead should be instantly hanged.

A few days passed without any change in the charger's condition, but one morn-

REACHED THE KING

ing the equerries, in going their round of the stables, were met by the groom, who told them that the King's favorite horse was dead.

Just imagine their consternation. Who was to tell the King? Who was to run the risk of being hanged? They stood talking and proposing various plans until the hour arrived for the daily bulletin to be delivered to his Majesty. At that moment one of the youngest equerries told the groom not to be afraid, and went himself to the King.

"Well!" demanded Frederick; "how is the horse?"

"Sire," replied the equerry, "the horse is in his usual place. He is lying down. He does not move. He has no strength. He does not eat. He does not drink. He does not sleep. He does not breathe. He does not—"

"Then, indeed," cried the King impatiently, "he must be dead."

"Your Majesty has spoken truly," replied the equerry calmly; "and it is you, sire, who have announced the fact."

THE FABLES OF ÆSOP THE SLAVE

THE CAT AND THE MICE

A CERTAIN house was overrun with mice, so its owners got a cat, who caught and ate a great number of the mischievous little animals.

The mice, finding their numbers growing thinner, consulted together how best to preserve themselves from the jaws of the cat, and decided that none of them should go below the top shelf, where the cat could not get at them.

The cat, finding that the mice no longer came down, got very hungry, and resolved upon a clever trick. She hung by her hind legs on a nail on the wall and pretended to be dead, hoping by this means to persuade the mice to come down.

She had not been hanging there long before a cunning old mouse peeped over the edge of the shelf, and said: "Ah, my good friend, you may hang there as long



as you like; but I certainly would not trust myself with you even if I knew that your skin was stuffed with straw."

It is better to be on the safe side.

THE TRAVELERS AND THE BEAR

TWO men, traveling through a forest together, promised to stand by each other in case any danger should threaten them. They had not gone far when a bear came rushing out of the wood.

Thereupon one of the travelers, being a good climber, got up in a tree. The other, who could not climb, fell flat upon his face and lay quite still, holding his breath. The bear came up and smelled him, but, supposing him to be dead, went back into the wood without doing him any harm.

When the danger was over, the man who had climbed the tree came down to his companion, and asked him what it

was the bear said when he put his mouth so close to the man's ear.

"Why," answered the other, "he advised me to take care in future not to put



any trust in such a coward as you are, or I should always be deceived."

A true friend will always stand by his companion in danger.

THE FIR TREE AND THE BRAMBLE

A TALL, straight fir tree that stood towering up in the forest was very proud of his height and dignity, and despised the little shrubs which grew beneath him. One day a bramble asked him why he was so proud.

"Because," replied the fir tree, "I look upon myself as the finest tree for beauty of any in the forest. My top shoots up toward the clouds, and my branches spread round in constant loveliness, while you crawl on the ground, liable to be crushed by every animal that comes near."

"All this may be true enough," replied the bramble; "but when the woodman has marked you for cutting down, and



the ax comes to be applied to your root, I fancy you will wish that you could change places with me."

Pride always goes before a fall.

THE SCHOOL EXAMINATION

This chapter is part of a longer story of a little Swedish girl and her father Jan. It is called the Emperor of Portugallia and some day you are going to read it to find out how it comes by its name, and then you will be charmed by its picture of country life in Sweden, and by the beauty of the relation between the father and his little girl. The author, Selma Lagerlöf, is a quite famous writer. In our Book of Stories we have several pictures of village schools. There are, besides this one in Ostanby, the famous Dotheboys Hall of Nicholas Nickleby, the school in Thrums to which Tommy went, and the school in Alsace where the last class was held.

WHEN the little girl was six years old Jan went along with her to the Ostanby school one day, to listen to the examinations.

This being the first and only school-house the parish boasted, naturally every one was glad that a long-felt want had been met. In the old days Sexton Blackie had no choice but to go about from farmhouse to farmhouse with his pupils.

Up until the year 1860, when the Ostanby school was built, the sexton had been compelled to change classrooms every other week, and many a time he and his little pupils had sat in a room where the housewife prepared meals and the man of the house worked at a carpenter's bench; where the old folk lay abed all day and the chickens were cooped under the sofa.

But just the same it had gone rather well with the teaching; for Sexton Blackie was a man who could command respect in all weathers. Still it must have been a relief to him to be allowed to work in a room that was to be used only for school purposes; where the walls were not lined with cubby-beds and shelves filled with pots and pans and tools; where there was no obstructing loom in front of the window to shut out the daylight, and where women neighbors could not drop in for a friendly chat over the coffee cups during school hours.

Here the walls were hung with illustrations of Bible stories, with animal pictures and portraits of Swedish kings. Here the children had little desks with low benches, and did not have to sit perched up round a high table, where their noses were hardly on a level with the edge. And here Sexton Blackie had a desk all to himself, with spacious drawers and compartments for his record-book and papers. Now he looked rather more impressive during school hours than

in former days, when he had often heard lessons while seated upon the edge of a hearth, with a roaring fire at his back and the children huddled on the floor in front of him. Here he had a fixed place for the blackboard and hooks for maps and charts, so that he did not have to stand them up against doors and sofa backs. He knew, too, where he had his goose quills and could teach the children how to make strokes and curves, so that each one of them would some day be as fine a penman as himself. It was even possible to train the children to rise in a body and march out in line, like soldiers. Indeed, no end of improvements could be introduced now that the schoolhouse was finished.

Glad as was every one of the new school, the parents did not feel altogether at ease in the presence of their children, after they had begun to go there. It was as if the youngsters had come into something new and fine from which their elders were excluded. Of course it was wrong of the parents to think this, when they should have been pleased that the children were granted so many advantages which they themselves had been denied.

The day Jan of Ruffluck visited the school, he and his little Glory Goldie walked hand in hand, as usual, all the way, like good friends and comrades; but as soon as they came in sight of the schoolhouse and Glory Goldie saw the children assembled outside, she dropped her father's hand and crossed to the other side of the road. Then, in a moment, she ran off and joined a group of children.

During the examination Jan sat near the teacher's lectern, up among the School Commissioners and other fine folk. He had to sit there; otherwise he could not have seen anything of

Glory Goldie but the back of her neck, as she sat in the front row, to the right of the lectern, where the smaller children were placed. In the old days Jan would never have gone so far forward; but one who was father to a little girl like Glory Goldie did not have to regard himself as the inferior of anybody. Glory Goldie could not have helped seeing her father from where she sat, yet she never gave him a glance. It was as if he did not exist for her. On the other hand, Glory Goldie's gaze was fixed upon her teacher, who was then examining the older pupils, on the left side of the room. They read from books, pointed out different countries and cities on the map, and did sums on the blackboard, and the teacher had no time to look at the little tots on the right. So it would not have mattered very much if Glory Goldie had sent her father an occasional side-glance; but she never so much as turned her head toward him.

However, it was some little comfort to him that all the other children did likewise. They, too, sat the whole time with their clear blue eyes fastened on their teacher. The little imps made believe they understood him when he said something witty or clever; for then they would nudge each other and giggle.

No doubt it was a surprise to the parents to see how well the children conducted themselves throughout the examination. But Sexton Blackie was a remarkable man. He could make them do almost anything.

As for Jan of Ruffluck, he was beginning to feel embarrassed and troubled. He no longer knew whether it was his own little girl who sat there or somebody else's. Of a sudden he left his place among the School Commissioners and moved nearer the door.

At last the teacher was done examining the older pupils. Now came the turn of the little ones, those who had barely learnt their letters. They had not acquired any vast store of learning, to be sure, but a few questions had to be put to them, also. Besides, they were to give some account of the Story of the Creation.

First they were asked to tell who it was that created the world. That they knew of course. And then, unhappily, the teacher asked them if they knew of any other name for God.

Now all the little A-B-C-ers were stumped! Their cheeks grew hot and the skin on their foreheads was drawn into puckers, but they could not for the life of them think out the answer to such a profound question.

Among the larger children, over on the right, there was a general waving of hands, and whispering and tittering; but the eight small beginners held their mouths shut tight and not a sound came from them. Glory Goldie was as mum as the rest.

"There is a prayer which we repeat every day," said the teacher. "What do we call God there?"

Now Glory Goldie had it! She knew the teacher wanted them to say they called God *Father*—and raised her hand.

"What do we call God, Glory Goldie?" he asked.

Glory Goldie jumped to her feet, her cheeks aflame, her little yellow pigtail of a braid pointing straight out from her neck.

"We call him Jan," she answered in a high, penetrating voice.

Immediately a laugh went up from all parts of the room. The gentry, the School Board, parents and children all chuckled. Even the schoolmaster appeared to be amused.

Glory Goldie went red as a beet and her eyes filled up. The teacher rapped on the floor with the end of his pointer and shouted "Silence!" Whereupon he said a few words to explain the matter.

"It was *Father* Glory Goldie wanted to say, of course, but said Jan instead because her own father's name is Jan. We can't wonder at the little girl, for I hardly know of another child in the school who has so kind a father as she has. I have seen him stand outside the school-house in rain and bluster, waiting for her, and I've seen him come carrying her to school through blizzards, when the snow was knee-deep in the road. So who can wonder at her saying Jan when she must name the best she knows!"

The teacher patted the little girl on the head. The people all smiled, but at the same time they were touched.

Glory Goldie sat looking down, not knowing what she should do with herself; but Jan Ruffluck felt as happy as a king, for it had suddenly become clear to him that the little girl had been his the whole time.

NOUREDDIN AND THE WONDERFUL PERSIAN

WHEN the good Harun-al-Rashid became caliph of Bagdad, he made his cousin Zenebi king of Balsora; and Zenebi then sought for a wife worthy to be his queen. He ordered his Minister to find for him a maiden perfect in charm and beauty, and excellent in wit and intelligence.

For a long time the Minister tried in vain to discover such a maiden, but one morning a merchant brought to his house a Persian slave-girl who was very lovely and possessed marvelous gifts. The Minister gave the maid a set of rooms in his house, and resolved to introduce her to the King. But in the course of the day Nouredin, the son of the Minister, saw her, and fell deeply in love with her. She returned his love, and when the Minister came to conduct her to the royal palace, he found the two young people seated together deep in talk with each other.

On seeing them thus he cried: "Oh, unhappy boy, you have ruined me! The King will find this out."

But after struggling between his affection for his son and his duty to the King, the Minister gave way and allowed Nouredin to marry the beautiful Persian. He then tried to keep the King quiet by pointing out how hard it was to discover a maiden in whom great beauty and great wisdom were joined. But the King found out about the Persian maid, and sent his men to bring Nouredin and the maid to him.

Happily, a friend of Nouredin heard the order and hurried out and warned him, and Nouredin and the beautiful Persian at once fled from Balsora and

boarded a ship sailing to Bagdad. But when they arrived at Bagdad, they did not know where to stay, for they had never been in this famous city before, and after wandering about the crowded streets until they were weary, they entered a gate leading to a beautiful garden, and there sat down by a fountain and fell asleep. At evening an old man came to the spot and woke them up.

"We pray you to pardon us for falling asleep here," said Nouredin. "We are strangers in Bagdad, and we walked about the city until we were quite tired out. This garden is really the most delightful spot that I have ever seen. Oh, what a happy man you are to possess it!"

Now, the garden was really one of the lovely pleasure grounds of the great Caliph, and the old man was only one of the keepers. But he was so flattered at being taken for the owner of the place that he at once offered to show Nouredin and the lovely Persian slave all over the lordly pleasure-house that stood in the middle of the garden opposite the royal palace. He led them up the wonderful golden staircase, and then into the great hall built of jasper and adorned with the richest treasures of the kingdom.

At the sight of all the splendor Nouredin was filled with joy, and he gave the old man a handful of gold, saying: "Do, please, allow me to provide a banquet this evening. Give this gold to one of your slaves and get him to buy a supply of meats and fruits and wine."

The old man ran out into the streets



"Pardon us, pray, for falling asleep," said Nouredin, when the old man came and woke them up at evening.

and bought a rich repast, and returned with it to the pleasure-house; and Noureddin and the beautiful Persian lighted all the costly lamps by the eighty windows of the great hall, and then they sat down with the old man and his guests to feast.

Now, the Caliph of Bagdad had a good view of the pleasure-house from his palace, and he was much surprised to see lights shining in all the windows of the hall. Any other ruler would have sent some courtier to inquire into the matter, but Harun-al-Rashid liked to see into things himself. So, disguising himself as a beggar, he went into the garden, and crept up to the pleasure-house just as the beautiful Persian commenced to sing to the sound of a lute.

"What a sweet voice!" he said. "I must find a way to see this charming singer without making myself known."

As he was wondering what to do, he saw a man fishing in the river that ran through the garden, and asked: "Have you caught any fish?"

"Two," replied the fisher.

The Caliph bought them; and entering the pleasure-house, he bowed low and said to Noureddin: "I see you are hold-

ing a feast, and as I have just caught two fine fish, I have brought them in the hope that they will add to your pleasure."

"Very well," said Noureddin. "Go and fry them in the kitchen."

The Caliph did so, and soon returned with the fish, and served it to the merry-makers.

When Noureddin had eaten his portion, he gave Harun-al-Rashid a handful of gold, and said: "I have never tasted better fish. Pray accept this little gift as a small return."

The Caliph took the gold and thanked Noureddin, and said: "Will you bestow an inestimable favor on me? Let me hear one song from the lips of the sweet singer at your side."

The beautiful Persian at once took up her lute and sang song after song, and the Caliph listened to her with exceeding delight. And in between the songs Noureddin related the story of their marriage and their flight.

Then Harun told Noureddin who he was, and he sent a letter to King Zenebi commanding him to retire from the throne, and he made Noureddin and the beautiful Persian king and queen of Balsora.

THE LUCK OF SIMPLE JACK

SIMPLE JACK was the best silk-weaver in Spitalfields, but he had not the least idea of the value of money. If he went out with plenty of silver in his pocket, he was sure to spend it, either upon his friends, who used to crowd round him, or in buying very many things for himself and his wife that were of no use at all.

And not only did Simple Jack do this, but he would pay whatever the seller asked for any article; and as the people all knew his weak points, Simple Jack was swindled whenever he went out to buy. He was just as silly if he wanted to sell, for then he would take whatever price was offered for his goods, no matter how absurdly low that price might be. So his wife used to do all the buying and selling that they needed.

But one day Simple Jack resolved to go a-marketing himself. He took a bundle of fine silks and sold them to a merchant for forty pounds.

Then, seeing a man with a donkey, he said: "That donkey would be useful to me. Will you take forty pounds for it?"

Of course, the man readily sold it at this high price. But Simple Jack found that the donkey was very obstinate, and it would not go the way he wanted.

"How much will you give me for this stubborn beast?" he said to a costermonger.

"It would be dear at ten shillings," said the artful costermonger.

Simple Jack took the ten shillings, and with the money he bought a sack of new potatoes. But the sack was very heavy, and Jack soon grew tired of his new bargain. So he exchanged it at a fish shop for a mackerel. Naturally his wife was very angry when he told her how he had spent the forty pounds. But on cutting the fish open, she found in it a great pearl of remarkable beauty.

"Why, this must be worth thousands of pounds!" she cried.

"There you are, my dear!" said Simple Jack merrily. "I spent a beggarly forty pounds in buying a fish containing a rich jewel, and yet you say that I do not know the value of money!"

THE NEXT STORIES ARE ON PAGE 4941.

FRENCH—ON THE WAY TO PARIS

First line, French; second line, English word; third line, as we say it in English.

Nous sommes à Calais.
We are at Calais.
We are at Calais.

Le bateau s'arrête.
The boat itself stops.
The boat stops.

Nous courons vers le bord.
We run toward the edge.
We run to the side.



Nous voulons quitter le bateau.
We wish to quit the boat.
We want to get off the boat.

Les marins baissent la passerelle.
The sailors lower the gangway.
The sailors let down the gangway.

Bébé dit: "Regardez ces bonshommes!"
Baby says: "Look at those manikins!"
Baby says: "Look at those funny men!"

Ils ressemblent à des poupées.
They resemble to some dolls.
They look like dolls.

Ce sont les gendarmes.
They are the men-at-arms.
They are policemen.



Il est presque une heure.
It is nearly one hour.
It is nearly one o'clock.

Nous allons à la douane.
We go to the custom house.
We go to the custom house.



Tout le monde cherche ses bagages.
Everybody seeks his baggage.
Everybody looks for his luggage.

Nous pouvons déjeuner maintenant.
We can to lunch now.
There is time for lunch.

Papa nous dit de rester près de lui.
Papa us tells of to stay near of to him.
Papa tells us to keep by him.



Nous avons du lait et des gâteaux.
We have some milk and some cakes.
We have milk and cakes.

Papa regarde sa montre.
Papa looks at his watch.
Papa looks at his watch.

Il faut se dépêcher.
It is necessary oneself to hurry.
We must hurry.

Le train nous attend.
The train us awaits.
The train is waiting for us.

Nous montons chercher des places.
We mount to seek some places.
We get in to look for seats.



Le train est complet.
The train is complete.
 The train is full.

Enfin nous nous asseyons.
At last we ourselves seat.
 At last we are seated.

Maman est très fatiguée.
Mamma is very tired.
 Mamma is very tired.



Un garçon me prête un livre.
A boy to me lends a book.
 A boy lends me a book.

Je dis: "Merci bien."
I say: "Thank you well."
 I say: "Thank you very much."

Je regarde le livre.
I look at the book.
 I look at the book.



Je le montre à Jeannette.
I it show to Jenny.
 I show it to Jenny.

Nous sommes quatre heures dans le train.
We are four hours in the train.
 We are in the train four hours.

Enfin nous voilà arrivés à Paris.
At last we there are arrived at Paris.
 At last we reach Paris.

Nous allons en voiture à l'hôtel.
We go in cab to the hotel.
 We drive to our hotel.

L'hôtel est un grand édifice.
The hotel is a large building.
 The hotel is a large building.

L'AMOUR RIT AUX INVENTEURS DE CLEFS

This is the French translation of the story told in English on page 2352.

"L'AMOUR rit aux inventeurs de clefs."

Telle fut la devise que le beau marquis de Hautmont grava sur son écusson quand il vint à Paris. Etant aussi audacieux qu'il était beau, il commença à courtoiser la princesse Marguerite, fille du roi, et le roi fut contrarié de cette témérité.

"Vous avez pris de grands mots pour votre devise," dit-il, "mais sont-ils vrais? Je vais enfermer la princesse dans une tour. Si vous pouvez y pénétrer avant un mois, il vous sera permis de l'épouser. Si vous échouez, vous mourrez."

Le marquis fit semblant d'être déconcerté. Cependant il ordonna secrètement à des sculpteurs de construire un grand rossignol en bois creux. Quand l'oiseau

fut fini et peint, le marquis y entra et joua de jolis airs de flûte pendant que ses servantes le traînaient par les rues.

Tout le monde se mit à parler du rossignol mécanique; le roi vint le voir, et la princesse Marguerite demanda qu'on le lui apportât. Le roi, pensant que la musique était produite par un mécanisme, fit porter l'oiseau dans la tour. Le marquis en sortit et embrassa la main de la princesse en disant: "Votre Majesté voit bien que l'amour rit aux inventeurs de clefs." Le roi fut obligé de reconnaître que c'était vrai, et, comme il vit que le marquis et la princesse s'aimaient, il leur permit de s'épouser et leur offrit une dot vraiment royale.

THE NEXT FRENCH STORY IS ON PAGE 4947.

LAND BIRDS OF NORTH AMERICA

THE same birds are not found in every part of a large continent or even of a large country. In fact, a man who knows birds, if put down in a strange land, could guess the general region by the birds he would see and the season of the year. There is some overlapping. Some birds have a very wide range, but the ornithologists have divided the continent of North America into several "provinces," or zones. It is of the many attractive birds of the Northern province that we shall first speak. Then we shall give you some chapters on the birds of the other provinces. This Northern province is the territory north of a line drawn from Boston, through Buffalo, Cleveland, Chicago and along the upper Missouri River. The birds of the Far West differ somewhat.

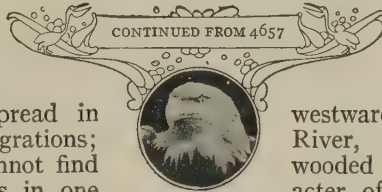
BIRDS OF NORTH AMERICA

LAND BIRDS OF THE NORTHERN PROVINCE : PART I

THE birds of North America, like those of all other continents, are not uniformly spread in their residence, or migrations; that is to say, you cannot find the same list of birds in one part of a continent that you do in another, except in the case of a very few kinds.

This is owing to several causes, the chief of which is climate and its effect on bird-food. It is evident that birds that are accustomed to get their food altogether from the ocean cannot live inland; and that those subsisting on fish, frogs and aquatic animals and plants will not be present on the dry interior plains and prairies, or among mountains, where lakes, large rivers and marshes do not exist. On the other hand, the seed-eating sparrows of the plains, the thrushes, finches, woodpeckers and others that depend on insects which feed on plants, have no reason to go to the seashore.

In addition to this, the birds (and other animals) of the Pacific side of the continent are different, on the whole, from those of the Atlantic slope and of the Mississippi Valley. The snowy ranges of the Sierra Nevada and the Rocky Mountains are too high for most of the Pacific birds to cross; and the wide, dry, treeless plains prevent a



large number of birds of the eastern half of the country from ranging much westward of the Mississippi River, although the more wooded and well-watered character of northwestern Canada enables eastern birds to extend their range much farther west there than in the United States. Such things as these influence the range of birds.

But there is another sort of distribution. Some birds are accustomed to go even to the Arctic regions to spend the summer and rear their young. Others are able, or choose, to go only as far north as southern Canada or northern United States. These are seen in the southern half of the United States only when passing through it to and from their winter home in the tropics.

Some remain in this Northern region all the year round because they find water and food that suit them. In winter various Arctic birds come south into southern Canada or into the northern part of the United States.

If you will draw a curved line on a map from Boston through Buffalo, Cleveland, Chicago, and northwestward to and along the upper Missouri River, you will define about the southern boundary of this Northern province. It is the birds of this region

which we shall describe in this chapter and the next, leaving the birds of the Southern province for another story.

WHY ARE BIRDS DIFFERENT IN DIFFERENT SECTIONS?

The only explanation of these variations in geographical distribution is that the variety of climate and food makes conditions in one region suitable for certain kinds of birds and not suitable for others; and each species inhabits that district, or "zone," where it thrives best.

In the Northern region we have many birds. More than two dozen are permanent residents, and a dozen or more are winter visitants. The great majority of our birds are summer residents only.



Cooper's Hawk is one of the small hawks which fly over the poultry yards, pounce down on the chickens and carry them off. It is sometimes called the Chicken Hawk.

They arrive from southern United States, the West Indies, and Central and South America in spring and early summer, and leave us for those warm regions when cold nights foretell the approach of winter.

THE RUFFED GROUSE, THE DRUMMER OF THE WOODS

Among permanent residents one of the most common is the Ruffed Grouse, often incorrectly called Partridge and Pheasant. (We have no true partridges or pheasants native to North America.) It, and other related species, are game birds which are protected by the game laws. It is a bird about seventeen inches long, with upper parts chiefly brown, but variegated with black, gray and white; large tufts of broad glossy black feathers on the neck; under parts chiefly white, tinged with buff and barred with blackish or grayish

brown. The tail feathers vary from gray to brown and are irregularly barred and mottled with black, with a broad dark band near the end. When the tail is spread it presents a beautiful fan-like appearance.

Of all the characteristics of this superb game bird, its habit of drumming is the most remarkable. The sound is produced by the male bird's beating the air with his wings as he stands firmly braced on some favorite low perch. It is the call to his mate, who approaches the old rendezvous, shy but responsive. The same perch may be used by the old male year after year. On the ground at the base of a stump or tree, or beneath some brush, the nest is made. It may contain from eight to fourteen pale yellowish brown eggs about one and one-half inches long and an inch broad. The young can run about as soon as they are hatched, and when one week old they can fly well. During the summer and autumn the grouse eats insects, berries and seeds, and in the winter, leaves and buds. To keep itself warm during cold nights in winter, it burrows into a snowdrift and there passes the night. Sportsmen delight in hunting the ruffed grouse, and its flesh is much prized at the table.

OTHER MEMBERS OF THE GROUSE FAMILY

The Canada Grouse, or Spruce Partridge, is a common inhabitant of coniferous forests. It has more feathers on the legs, but the toes are bare. The throat is black, and is separated from the black breast by a broken circular band of black and white. The tail is black, tipped with brown. Its eggs are larger than those of the ruffed grouse, and are more or less speckled or spotted with deep brown. This bird is sometimes called the Wood Partridge.

The Quail, or Bobwhite, belongs to the same family. It is only about ten inches long. The male in winter has upper parts varying from reddish brown to chestnut; a black band on the upper breast; the throat and a broad line from the bill over the eye white; the lower breast and belly white, barred with black; and an ashy gray tail. On the ground in grassy fields the female lays from ten to eighteen white eggs about one inch broad. It is found only in the warmer sections of eastern Canada, but is common farther south and has been introduced in the Far West.

SOME FEATHERED RAIDERS OF THE AIR

Hawks are birds of prey. They often make raids upon the poultry yard, and always prefer feathered game to any other. The Sharp-shinned Hawk and Cooper's Hawk are those which often attack poultry. They are both small, but possess great boldness and dexterity. The former is about a foot long; with upper parts slaty gray; primaries barred with blackish; white throat streaked with black; under parts barred with white and buff; and an ashy gray, nearly square tail with blackish crossbars and whitish tip. Cooper's Hawk is very similar, but larger, and with the crown blackish.

They build nests in trees, fifteen to fifty feet above the ground, and lay from three to six bluish white eggs about two inches long. Because of its larger size, Cooper's hawk is more destructive to poultry. Both are fearless, daring, aggressive; and watching their prey from a lookout, then flying swiftly and low, they make a sudden dash at the frightened animal and grasp it in their talons. They are very often called Hen Hawks and Chicken Hawks.

The latter names are applied also to the Red-tailed Hawk and the Red-shouldered Hawk. Both like chickens. The former is about twenty inches long; with upper parts brownish; upper breast heavily streaked with grayish brown; the upper belly streaked, spotted or barred with black, forming a kind of broken band across the belly; the lower belly generally white; and the tail rich brown, with a narrow black band near its end and a white tip.

The Red-shouldered Hawk is about the same size; with conspicuous reddish brown "shoulder" patches, and a blackish tail with four or five white crossbars and a white tip. Both are common species, but give little trouble to the farmer, though unjustly blamed for the sins of their bird-killing relatives. They live chiefly on mice, moles, frogs and insects. The hawks already described are permanent residents in most parts of the province.

THE MANY HAWKS WHICH ARE FOUND IN THIS REGION

The American Goshawk is a bird of Northern regions, wintering as far south as Virginia. It is one of the most daring of all the hawks, and will dart down sud-

denly and carry off a chicken which may be only a few feet from a person. It is nearly two feet long; with upper parts bluish slate color; a blackish head; and the breast and belly barred pale slate and white, with sharp black streaks. It nests in trees and lays from two to five white eggs faintly marked with pale brown. This hawk is so large and powerful that it is quite capable of killing and carrying off a full-grown hen.

The Marsh Hawk is often seen gracefully skimming over the low meadows, or occasionally hanging poised over one spot for a second or two and then dropping down into the long grass. This drop may mean the death of a mouse or a frog. It seldom attacks a domestic fowl, but destroys an enormous number of field-mice each year. The male has gray or ashy upper parts; a silvery gray tail irregularly barred with black; and lower breast and belly white, with bars or spots of rufous. It lays from four to six dull white eggs on the ground in marshes.

The most unsuspicious of all hawks is the Broad-winged Hawk, which is chiefly distinguished from other species by the three "notched" primaries and its smaller size. It breeds throughout Eastern North America. During early summer it may be seen for hours sitting on the dead top of some high tree. It feeds chiefly on mice, reptiles and insects.

The American Rough-legged Hawk, a large species characterized by feathered tarsi and heavily marked under parts, breeds in Canada and winters in the United States. It is somewhat nocturnal in its habits, and may be seen in the fading twilight watching from some low perch or beating with measured, noiseless flight over its hunting-ground. Its flight is seldom rapid and often appears labored.

The Pigeon Hawk has slaty blue upper parts; a rusty collar on the neck; three or four distinct grayish white bars on the tail; and under parts of cream-buff or yellow streaked with black, except on the throat. It nests in trees or on cliffs, and lives chiefly on small birds.

The American Sparrow Hawk is less than a foot long; with a brownish back more or less barred with black; a slaty blue head; under parts chiefly cream-buff; and belly and sides spotted with black. It breeds as far north as Hudson Bay and winters in the southern states. Its call is a high, quickly repeated *killy-killy-killy-*

killy; and, as the name suggests, it lives on small birds, mammals and insects.

THE FISHERMAN THAT SELDOM MISSES

The Fish Hawk, or American Osprey, is a common species. It has upper parts, head and nape brownish, varied with white, and white under parts. This species lives in colonies or in pairs along our coasts, and returns year after year to the same nesting-ground. Its note is a high, rapidly repeated, plaintive whistle. It is



The Screech Owl frequently lives in a hollow limb of an old apple tree, where it can hide through the day from the small birds that might attack it.

a good fisher. Winging its way slowly over the water, it keeps a close watch for fish. When one is observed, it hovers for a moment; then descends with rapid speed and directness, strikes the water with great force, making a loud splash, frequently disappears for a moment, then rises with its prey grasped in its powerful talons, and flies to a favorite perch.

The Golden Eagle is of rare occurrence east of the Mississippi, but the Bald Eagle breeds throughout North America. The head, neck and tail are white, and the rest of the plumage is brownish. It lives chiefly near water and subsists principally on fish. The nest is found in tall trees and contains two or three dull white eggs nearly three inches long.

NIGHT BIRDS THAT PREY ON SMALL BIRDS AND ANIMALS

Owls are found in all parts of the world, and about twenty species inhabit North America. They are chiefly woodland birds, while some make their home in towers or outbuildings. Owls are birds of prey, and birds of the night, living chiefly on small mammals. They have weird, human voices, and are usually regarded with superstitious fear. Their eggs are uniformly white and unmarked. Only a few common species will be described.

The Long-eared Owl has conspicuous ear-tufts an inch or more in length; upper parts brownish mottled with white; a tail with six or eight crossbars; and sides and belly irregularly barred with brown. It spends the day in the shade of evergreens. Like other owls, its flight is slow and wavering, but, in common with them, it is buoyant and devoid of any appearance of heaviness.

The Barred Owl, or Hoot Owl, has no ear-tufts. The upper parts are grayish brown; the under parts white; the breast barred; and the sides and belly broadly streaked with brown. The deep-toned, questioning voice, the absence of "horns," and the dark brown, nearly black eyes combine to make barred owls appear strangely human. Their usual call is a sonorous *whoo-whoo-whoo*, uttered during the first part of the night and again before sunrise, or, on moonlight nights, throughout the night.

The Saw-whet Owl is only about eight inches long. Its upper parts are cinnamon-brown; the back spotted with white; the tail with three or four imperfect white bars; the under parts white, heavily streaked with cinnamon-brown; and the legs and feet feathered and buffy white. It nests in a hole in a tree. During the day it frequents dark woods and sleeps so soundly that often it may be captured.

The Screech Owl is known by its small size and ear-tufts when seen; and when night comes, by its tremulous, wailing whistle—a weird, melancholy call welcomed by few. It frequently makes its home near dwellings and may nest in them. Its favorite retreat is an old apple orchard, where the hollow limbs offer it refuge by day from smaller birds which may attack it. There are still superstitious persons who believe that the call of this bird foretells misfortune to the house it visits.

THE GREAT OWLS OF THE WILDER REGIONS

The Great Horned Owl is nearly two feet long and has conspicuous ear-tufts nearly two inches long. The upper parts are mottled with varying shades of buff and black; there is a white patch on the throat; and the under parts are a yellow-buff, barred with black. The legs and feet are feathered, and the eyes are yellow. The great horned owl is common in wilder, less settled, wooded regions, and is very fond of rabbits. Its call is a loud, piercing, blood-curdling scream.

The Snowy Owl is a bird of cold, Northern regions, but it may wander southward in winter. It is large, without ear-tufts, and is white, with bars of grayish brown. The legs and feet are heavily feathered, and the eyes are yellow. Its flight is firm, smooth and noiseless. It is diurnal in its habits, and is most active during the early morning and again before dusk.

The Hawk Owl is also diurnal in its habits, and its flight is swift and hawk-like. It breeds in Northern regions and comes south in winter. The size is medium; the upper parts grayish brown; the head and neck spotted with white; the under parts barred with brown and white; and the tail long and rounded.

WOODPECKERS THAT DESTROY THE ENEMIES OF OUR TREES

Woodpeckers of several species are common in the North. As a rule, they are solitary, and they are the best climbers among all birds. Two toes of each foot are directed forward and two backward, except in one group, and this structure of the feet, together with the pointed, stiffened tail feathers, assists them in clinging to upright surfaces. The bill is stout and chisel-like, and is used to cut away wood and reach grubs, which are drawn out of their hiding-places by the long tongue with its horny tip. Woodpeckers nest in dead trees and lay white eggs.

A most common species is the Hairy Woodpecker, which is about ten inches long; with black upper parts; white under parts; wings spotted with white; a white stripe above, and another below, the eye. The adult male has a scarlet patch on the back of the neck.

The Downy Woodpecker is very similar in color and markings, except that in the latter the outer tail feathers are white, barred with black, and in the former they

are white without bars. The Downy is shorter, and the feathers more downy and fluffy. It is the smallest and the best known of all our woodpeckers. He visits the orchard and shade trees, and tells of his presence by the *tap, tap, tap*, on the trees as he patiently digs out grubs and larvæ. The valuable work done by these birds for the protection of our trees should commend them to every nurseryman. The toughest cocoon ever spun by a caterpillar is no protection against the sharp beaks of these birds. The food of both birds consists almost entirely of insects, with the seeds of the hemlock or the berries of the sumac for dessert.

The most beautiful bird of the family is the Red-headed Woodpecker; with the head, neck and upper breast deep red; the lower breast and belly white; and the upper parts and the tail black, except the white hump and white patches on the wings. The Downy and the Hairy are winter residents, but the Red-headed generally migrates southward in the autumn. These red-heads are noisy, active birds; and their brilliant plumage and loud, rolling call make them conspicuous. In early spring they feed on insects, which they catch on the wing; but after the small fruits ripen, their tastes change, and they visit the strawberry and raspberry patches.

A WOODPECKER WHICH HAS FORTY NAMES

The Golden-winged Woodpecker has more colors and more names than any other bird. A few of its forty names are Flicker, High-hole and Yellow-hammer; and these names are the reflections of its habits, notes and colors. The top of the head is a sky-gray; across the neck is a bright scarlet band; the upper parts are brownish gray, barred with black; the sides of the head, throat and upper breast are yellowish brown; a broad black stripe on either side of the throat runs backward from the base of the bill; a broad black crescent spans the breast; the under parts are white, tinged with yellow, and the tail is black above, and yellow, tipped with black, below. The Flicker is a bird of character, and does not always follow the habits of the family. It does less woodpecking than any other of its class, and is really a ground-feeder, living chiefly on ants and other ground insects. For the most part it winters in the South.

The Yellow-bellied Sapsucker is another woodpecker. The adult male has a

crimson crown and chin; black and white wing coverts and back; wings black, with a large white bar; black tail; breast black, edged with yellowish; and the under parts dull yellowish; and white sides, streaked with black. It is a small woodpecker, which prefers sap to insects. In spring, when the sap is rising, it bores small holes in the bark of various trees and sucks the sap which flows from the holes. Apart from this habit, which may render young trees somewhat unsightly, the bird has an excellent record. It devours great num-



The friendly little Chickadees live with us through the snowy weather. They are friends of the gardener, for they live on the eggs and larvæ of insects which destroy fruit trees and shrubs.

bers of ants, beetles and moths, which it obtains from rotten wood. It is a summer resident only.

**THE PILEATED WOODPECKER,
"COCK OF THE WOODS"**

The Pileated Woodpecker, known as the "Cock of the Woods," is about seventeen inches long and is the largest of our woodpeckers. The male has a scarlet crown and crest, and a red mark extending back from the bill. The upper and under parts are brownish black, and a broad white stripe extends from the bill backward, on either side, to the wings. This bird is common only in the wilder parts of the country. Its flight is rather slow, and when under way, the markings of the wings show plainly. The Arctic Three-toed and the American Three-toed, as the names suggest, have only three toes on each foot, two in front and one behind.

They are restless, active birds of Northern regions. The males of both have an orange spot on the crown. The Arctic is a little larger and is seldom found far down in the United States.

The Nuthatches are closely related to the woodpeckers. We have two species in the North, the White-breasted and the Red-breasted. They are resident species frequently seen around cultivated lands in the winter. They are active insect-destroyers, picking their food from bark, twigs and leaves, and are of great value to the fruit-grower because of the immense quantities of insect eggs and larvæ which they destroy. Their call is a nasal *yank-yank* and a repeated *ya-ya*, all in the same tone. The White-breasted Nuthatch is about six inches long, with a bluish black crown, slate upper parts, white under parts, and a short tail. The Red-breasted has the top of the head and a wide stripe through the eye shining black; a white line over the eye; the upper parts bluish gray; the throat white; and the under part reddish brown. Few birds are more easily identified.

**THE FRIENDLY CHICKADEES THAT
HELP TO SAVE OUR FLOWERS**

Chickadees are permanent residents and are also insect-eating birds. They closely inspect the bark of trees for insect eggs and larvæ.

"Were it not for me,"

Said a chickadee,

"Not a single flower on earth would be;
For under the ground they soundly sleep,
And never venture an upward peep,
Till they hear from me,
Chickadee-dee-dee."

The Black-capped Chickadee is a small, fluffy bird; with top of head, nape and throat shining black; the sides of the head and neck white; the back ashy; the breast white, with belly and sides washed with cream-buff. It builds a nest of moss, grass and feathers in old stumps, and lays from five to eight small white eggs, spotted and speckled at the larger end with brown. The Hudsonian Chickadee has a dull, dark brownish gray crown. No bird speaks its name so plainly as a chickadee, and no bird has more friends, because he is sociable with all. In an unconcerned way he hops from limb to limb, whistling softly the while, picking an insect egg from this crevice in the bark and a larva from another, all the time performing acrobatic feats. After satisfying his ap-

CHARACTERISTIC NESTS OF AMERICAN BIRDS



1. Yellow Warbler (type of hempen nest in small tree). 2. Wild Cliff Swallow; Eaves Swallow (nests made of mud). 3. Typical Hawk's, Owl's or Crow's nest (in a forest tree). 4. Redstart's nest (showing a Cowbird's intruded egg). 5. Red-eyed Vireo (hammock-like suspended nest). 6. Nest and eggs of Blue Jay. 7. Nest-hole of a Tree Swallow. 8. Nest-hole originally dug by a Woodpecker, now the home of a Wren. 9. Phoebe Flycatcher (on a beam in a stable). 10. Mourning Dove. 11. Fish Hawk, or Osprey. 12. Grouse. 13. Grebe. 14. Tern.

petite, he looks at the onlooker with his sparkling black eyes, speaks to him in liquid gurgles, and then flies away to the woods.

THE LITTLE BROWN CREEPER SEARCHES FOR BUGS

The Brown Creeper is another small bird which, like the chickadee, searches for insects, eggs and larvæ which are hidden in crevices of bark. He starts at the bottom of the trunk and winds his way upward in a nearsighted manner. Having reached the top of his spiral staircase, he suddenly drops to the base of another tree and resumes his task. The upper parts are mixed brown and white; the rump pale brown; the tail grayish brown, with feathers stiffened and pointed; and the under parts white. It builds its nest in the loose bark of a tree and lays from five to eight spotted and speckled eggs. All of the true creepers except this industrious foe of insects are birds of the Old World. The so-called Black-and-white Creeper is really a warbler, but the habits are similar.

GOOD AND BAD HABITS OF CROWS AND BLACKBIRDS

A Crow can speak for himself, and is well known to most boys and girls. He is about twenty inches long and is black all over. The farmer is well acquainted with his corn-pulling habit, and even the "scare-crow" does not frighten him. He is a vegetarian to the extent of two-thirds of his diet, and one-half of this vegetable matter consists of grain, chiefly Indian corn. Sometimes he is guilty of destroying the eggs and young of small birds. On the other hand, he does much good by destroying injurious insects, mice and other rodents, and is valuable occasionally as a scavenger. He seems to rejoice in being an outlaw.

When caught young, the crow is easily tamed, though it is likely to be a mischievous pet. It learns to distinguish different members of the family and has been known to show signs of recognition after long absence. It often steals objects and hides them. Sometimes servants have been accused of stealing jewelry when the real culprit was this noisy pet. It often imitates the sounds it hears and some have been known to speak quite a number of words. The Fish Crow is very much like the common crow but is smaller. It is chiefly a bird of the Southern province.

Blackbirds are closely related to crows, but are much smaller. Both walk, while most birds hop. The Bronze Grackle, or Crow Blackbird, breeds as far north as Labrador, and winters in the lower Mississippi Valley. It is about twelve inches long, and the general color is bronze, with metallic purplish reflection on neck, throat, wings and tail. The name Crow Blackbird is also applied to the Purple Grackle, which does not often go north of Massachusetts. The chief difference is that the purplish reflections are arranged in bars. The female is duller.

The Rusty Blackbird is smaller. The plumage of the male is a glossy bluish black. The female is slate color in spring, and rusty brown in fall and winter. The Red-winged Blackbird is distinguished by the patch of red and cream on the shoulders in the male. The female is smaller, grayish brown, and heavily streaked with brown or black. A near relative, the European Starling, has become naturalized, and in some sections has become a great nuisance.

Blackbirds are not liked by the farmer. Little can be said in their favor, except that at times they eat a large number of cutworms. They are early migrants, arriving in March and resorting at once to their nesting-places in swamps or woods. Early in the season they live on insects, but as soon as grain is sown they visit the sown fields and help themselves liberally, varying their diet by robbing the nests of smaller birds.

THE RAVEN, THE BIRD OF SUPERSTITION AND GLOOM

Ravens and crows are near relatives. The Northern Raven is practically the same as the raven of the Old World. In America it is a bird of the North, though occasionally found south of New England. It is about twice the size of a crow, and its plumage shows a bluish metallic lustre.

It eats everything, including carrion. It robs the nests of birds, swallowing the eggs or the young birds with equal relish. It attacks young or sick animals, but will also eat insects, fruit or grain. When hatched, the young are more white than black, and at first are fed on food partly digested and disgorged by the mother bird. The parent birds look after them until they are almost full grown. Like the crow, a young raven is easily tamed and may learn to say a number of words.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 4829.

CHAUCER'S CANTERBURY TALES

THE most famous of the writings of Geoffrey Chaucer, the first great English poet, is the work known as The Canterbury Tales. Its plan is simple. We are to imagine a company of "pilgrims"—which did not mean religious people, but good and bad alike—setting out from the Tabard Inn, at Southwark, in April, 1387. Some were on horse and some on foot, but all were journeying to visit the shrine of St. Thomas à Becket, at Canterbury. The landlord of the inn proposed that each pilgrim, to pass the time, tell a story on the way to Canterbury, and another on the way back. As there were thirty-three people in the company, including Chaucer himself, that would mean sixty-six tales. But the poet wrote only twenty-four. Though the book is incomplete, it is longer than the Iliad. Seven of the stories have been chosen for retelling here. Our language has changed so much that syllables have to be pronounced which are not sounded now. These are marked with accents.

THE PATIENCE OF GRISELDA

THE TALE TOLD BY THE CLERK

IN Chaucer's time a "clerk" meant a student or any learned man. We still speak of a clergyman as a "Clerk in Holy Orders." This is the story told by the student to his fellow-pilgrims.

A gifted but pleasure-loving nobleman named Walter, lord of the noble country of Saluces, in Italy, was asked by his subjects to marry, so that an heir might be left to them when he had gone. Near his palace was a little village which the marquis passed through when he went hunting.

Among the poor folk of this village dwelt a man called Janicula who had a daughter, "the fairest under the sun." This humble maiden, whose name was Griselda, was as virtuous and dutiful and hard-working as she was beautiful. Often, when on his way to the chase, had the marquis's eye rested on Griselda. Bearing in mind his people's wish, he determined that if he did marry she should be his wife. He had fixed a day for his wedding, as his people had desired. The day came and still none knew who was to be the bride.

All preparations were made for the ceremony. Costly dresses were made, gems prepared for his lady that was to be, and a gallant company were invited to the feast. Then a brave procession, headed by the marquis, set out from the palace to escort the bride.



The marquis led the way to the little village. Here Griselda was busily engaged

getting her household tasks done, so that she might afterward stand at her father's door and see the wedding procession.

As she was setting out to draw water at the well, the marquis stopped the procession at her rude dwelling. Calling her by name, at which she almost swooned, he asked for her father. Griselda answered that he was within, and then brought him forward. After conferring with her father the marquis asked Griselda if she would marry him, giving him all obedience. Griselda pleaded her unworthiness of so much honor, but replied that if it were her lord's will, she would marry him and obey him in all things. Then the marquis, taking her hand, led her forth from the hut and said to his people: "This is my wife. Honor and love her as you love me."

Griselda was straightway dressed in royal robes. Looking more lovely than ever, she was set on a beautiful horse, on which she rode to the castle, where the marriage was celebrated with much feasting.

Walter and she then lived for a time in great happiness, Griselda winning all hearts until she was known afar. Then was Walter moved to try her obedience sorely. When a little daughter was born to them, he told her that

his people were displeased, and that she was the cause of the trouble. Obedient to her husband's wish, Griselda gave up her child, thinking she would never see it any more. So, when a son was born, him also she gave up. Then the marquis chided her with her lowly origin, though her conduct was such that one born and reared to fill a great position might have been proud of it. He said that she must return to her father to make way for another whom he was to marry. In this, as in all other things, was Griselda submissive.

The people, who loved her, were angry at the marquis's cruelty. The new bride came in state with her brother from Bologna, and the people saw that she was fairer and younger than Griselda. They, with the fickle hearts of the crowd, thought that the marquis had done well.

Yet was Griselda to be further tried. The marquis sent for her to greet the new arrivals, because she alone knew how such ceremony should be carried out. So, in her humble attire, Griselda went back to the castle to obey her cruel lord's behest. And all the guests wondered who this humble and beautiful lady was that knew such honor and such reverence. At last, when the feast was spread, the marquis called for Griselda, and, as if in jest, asked her how she liked his new wife.

"Right well, my lord," quoth she; "for in good fay,

A fairer saw I never none than she.
I pray to God give her prosperity;
And so hope I, that He will to you send
Pleasaunce enough unto your life's end.
One thing warn I you, and beseech also,

Hurté not ever with no tormenting
This tender maiden, as ye have done me;
For she is fostered in her nourishing,
More tenderly, and to my supposing
She could not adversity endure
As could a pooré fostered créature."

And when Walter saw her patience under this great trial, his heart was at length touched.

"'Tis enough, Griselda!" he cried. "Be no more afraid. Now know I, dear wife, your steadfastness." He took her in his arms and sought to comfort her, so overcome was she at what he said. He told her that it was her own daughter whom she had just received as his new bride, and that the boy was her son. He had sent the two to Bologna, where they had been fittingly cared for and brought up secretly. Griselda was then dressed in the royal robes. There was great rejoicing, and the rest of her life was full of happiness. Says the poet:

Full many a year in high prosperity
Lived these two in concord and in rest,
And richly his daughter married he
Unto a lord, one of the worthiest
Of all Italy; and then in peace and rest
His wife's father in his court he keepeth,
Till that the soul out of his body creepeth.
His son succeedeth in his heritage,
In rest and peace after his father's day;
And fortunate was eke in marriage,
Though he put not his wife in such a say.
This world is not so strong, no, by my fay,
As it hath been, in oldé times yore,
And hearken what this author saith therefore.
This story is said, not for that wivés should
Follow Griselda in her humility,
For this could not be borne, no, tho' they
would;
But for that every wight in his degree
Shouldé be constant in adversity
As was Griselda.

THE FOX REPAID IN HIS OWN COIN

THE TALE TOLD BY THE PRIEST

THERE was once a poor widow, in the little yard attached to whose dwelling was a very fine cock, called Chanticleer. One morning this bird awoke with terror and told his mate, Pertelot, of a horrible dream that he had had, of a beast like a hound that threatened him. Dame Pertelot laughed her Chanticleer's fears to scorn. It was, said she, the result of indigestion, for which she suggested that he should take certain medicines.

While Chanticleer was enumerating stories of dreams that had come true, he

looked upon Dame Pertelot's face, and, taking courage, begged that they should talk of cheerful things. By this time daylight had come, and, descending from his perch, Chanticleer strutted around like a lion, chuckling whenever he found a corn.

But one day, as he was proudly walking about the yard, crowing at the sun, he spied a fox that had crept in the night before and hidden in a bed of herbs. Then Chanticleer, reminded of his dream, would have fled, but the fox, addressing him, said:

"Gentle sir, alas! why would ye go? Be not afraid of me. I am your friend. I only came to hear you sing, for, truly to you as sweet a voice is given as any angel hath that is in heaven. Your father and your mother both have been in my house. I never heard anyone except you sing so well as your father did. Let us hear now if you can imitate your father."

Chanticleer, much flattered by the remarks of the sly fox, stood high upon his toes, stretched his neck, made his eyes to close, and began to crow right loudly. Then Dan Russell, the fox, jumping up, seized him by the throat, and fled with him toward the wood.

Such an alarm was then raised by Dame Pertelot and the other hens that the widow and her daughters ran out of their dwelling. Seeing how matters stood, they called the neighbors, who joined in the chase. Jack Straw and all his company never made such a to-do as was

caused by the chase after the fox and Chanticleer.

As he was lying helpless in fear on the fox's back the cock thought of a plan. "Dear sir," said he to his captor, "if I were you I would turn on yon proud fellows and tell them that, now that you are near the wood, the cock shall here abide. And you will surely eat him, when you choose, whatever they may do."

"In faith," declared the fox, "it shall be done."

But as he spoke the cock slipped from his mouth and quickly flew high up on a tree out of reach. The fox cried that he was sorry for frightening the cock. He did it, he said, with no base intent. If Chanticleer would only come down again he would tell him why he had acted as he had done.

But Chanticleer replied that he had been deceived once and would not be deceived again. And so the fox was paid in his own coin—flattery.

THE STRANGE ADVENTURES OF A PRINCESS

THE TALE TOLD BY THE LAWYER

CONSTANCE, the daughter of the Emperor of Rome, was of such goodness and beauty that, when travelers returned from that city, they could not sing her praises too highly. The Sultan of Syria heard of her from his merchants. He was so affected by their reports that he sent word to her father offering to become Christian, with all his nobles, if he might have her hand in marriage.

The marriage took place. But the sultan's mother, who was secretly opposed to the union, invited the bride and bridegroom, and all the Christian knights who accompanied them from Rome, to a great feast. Then she caused them to be treacherously murdered, all save Constance. Her she sent adrift to sea in a rudderless boat, with all the rich wedding gifts and a store of food and raiment.

In this frail bark Constance was driven far, and finally cast on the shores of Northumberland. Here she was found by the constable of a castle which stood near. He and his wife Hermyngyld befriended her and became Christians.

A young knight of Northumberland, being refused by Constance, sought to bring her to a shameful death. He killed Hermyngyld secretly and accused Con-

stance of the crime. She was tried before King Alla of Northumberland, whose gentle heart was touched with pity by her tears. A miracle occurred which was thought to prove her innocence. So the false knight was put to death, and she became King Alla's wife.

But Alla had a mother who was bitterly opposed to this marriage, and in her son's absence had Constance once more sent adrift with her baby boy. When King Alla discovered this, he killed his wicked mother with his own hand, and gave himself up to grief and lamentation. Meanwhile, Constance and the little Maurice were rescued from a heathen land on which they had been cast. Eventually they were taken to Rome, where they were befriended by a senator and his wife.

All this time Constance kept her pitiful story to herself, but her goodness caused her to be beloved by all.

Then King Alla, smitten with repentance for the death of his mother, journeyed on a pilgrimage to Rome. He was received by the very senator who had befriended Constance. Being invited to a feast by Alla, the senator took young Maurice with him.

Attracted by the child's face, Alla

asked as to the boy's history. Musing on all that the senator could tell him, and full of thoughts of the wife he mourned as one that was dead, Alla afterward went as a guest to the senator's house. Here Alla and Constance met and recognized each other immediately. Constance, who thought it was by Alla's orders she had been cast adrift, sank down in a swoon. Then the truth became known to her concerning the treachery of King Alla's mother. Husband and

wife being reconciled, Constance made herself known to her father, the emperor. So at last all were come to happiness.

Alla shortly after took his wife back to England. But only a little while in joy and pleasure lived Alla and his Constance before Alla died.

Constance then returned to Rome, where Maurice was made emperor in course of years. The remainder of his mother's days were passed in acts of virtue and charity.

THE MEN WHO WENT TO KILL DEATH

THE TALE TOLD BY THE PARDONER

IN those days there were men who were permitted to grant to others, in the name of the pope, "pardons" for their sins. Such a pardon was known as a "papal indulgence." The men who dealt in them were called "pardoners." Here is the story told by the pardoner whom Chaucer includes among his pilgrim group:

In Flanders lived a company of young revelers who practiced all forms of folly and wickedness. Three of these ne'er-dowells were one day seated in a tavern drinking, when a bell was heard tolling for a man who was dead. One thereupon called out to his servant to get for them the name of the dead man. The varlet replied that he had no need to go out to learn who it was that was dead.

"It was," said he, "told me two hours before you came here. The dead man was an old comrade of yours. He was slain at night, as he sat on his bench drinking, by a silent thief men called Death, who hath killed a thousand of pestilence in this country."

The lad's story was confirmed by the taverner, who added that Death had that year slain many men, women and children, peasants and pages, in a great village within a mile away.

At this one of the roisterers invited his fellows to join with him that they might seek out Death and slay him. And the three set out on their errand toward the village spoken of. On their way they met an old man who besought their mercy.

"Nay, old churl," said they, "tell us where this same Death is, that killeth all our friends, or thou shalt die."

"Now, sirs," replied the old man, "if thou art so eager to find Death, turn up this crooked way. You will find him in

yonder grove beneath an oak tree, where I left him."

On learning this the three young men ran in the direction indicated, and coming to the tree, found a great store of golden florins piled up. No longer did they think of their quest of Death, but forthwith sat down by the precious hoard.

"Fortune," said the youngest of the three, "has given us this treasure that we may live in mirth and jollity. It must be carried home to my house or to yours by night. If men saw us with it in the daytime, we should be hanged for carrying what is our own."

He proposed that they should draw lots to decide which of them should go to the town for food and wine, while the other two kept watch over the treasure. The lot fell on the speaker.

When he had departed, one of the others said to his companion that it would be much better if the gold were divided between only two of them. "Two of us are stronger than one," said he, "and when our companion returns, do you engage him, as it were, in a playful wrestling bout. I will strike him with my dagger, and if you dispatch him with yours, then all this gold shall be ours to gratify all our wishes and enable us to play at dice as much as we like." The second villain agreed to this dastardly plan.

But wicked thoughts entered also the mind of the youngest as he went toward the town. Thinking how he could gain the gold for himself, he bethought him of the apothecary's. There, on the pretext that he wanted to kill rats, he bought some powerful poison. Next he borrowed three bottles, into two of which he poured the poison. Filling the bottles

with wine he returned to his companions. When the other villains had killed him, as they had planned to do, they said, "Let us sit down and drink and make merry before we bury him." And one, taking up a bottle—it was one contain-

ing poison—drank from it and passed it to his companion, who also drank.

So, both dying of the poison, the words of the old man who had told them that they would find Death under the oak tree were proved to be true.

THE ROMANCE OF THE LADY EMELYE

THE TALE TOLD BY THE KNIGHT

ONCE upon a time, in ancient Greece, there lived a great duke named Theseus. No greater conqueror than he lived under the sun. He defeated the Amazons of Scythia and married their queen Hippolyta. Her fair young sister Emelye he took captive. On his way back to Athens he was met by weeping women, who besought his help because the tyrant Creon had massacred their husbands and captured the throne of Thebes. Sending Hippolyta and Emelye to Athens, Theseus turned aside, and with his army marched on Thebes. There he slew Creon by his own hand and routed the tyrant's forces.

After the battle there were found, wounded and lying near where the fight had been fiercest, two handsome and richly dressed young men named Palamon and Arcite, cousins of the royal house of Thebes. Now, because of a vow he had made against Creon's house, Theseus ordered these young men to be kept in prison at Athens for life. When they had recovered from their wounds, Palamon and Arcite were therefore thrown into a dungeon in a strong tower near Theseus' palace.

It also happened that the narrow window of their dungeon overlooked the royal garden. Here one bright May morning the Lady Emelye,

Far fairer to be seen
Than is the lily on her stalké green,
And fresher than the May with flowers new,
came forth to walk and gather flowers.

Her yellow hair was braided in a-tress,
Behind her back a yardé long, I guess.
And as an angel heavenly she sang.

Palamon himself awoke with the sun, heard the sweet song, and peering through his prison bars upon the fair scene beneath, was stricken to the heart with love for the fair Emelye. His cry of pain aroused Arcite.

"Cousin mine," exclaimed Arcite in alarm, "what aileth thee? Why criest

thou? Take in all patience our imprisonment, for the stars ordained it when we were born."

"Cousin," replied Palamon, "you are wrong. It was not our imprisonment that caused me to cry out. The fairness of the lady that I see yonder in the garden is the cause of my woe. I know not if she be woman or goddess in human form."

Then went Arcite to the narrow window, and when he, too, saw Emelye walking in the sunlight, his despair was even greater than Palamon's.

"If," he cried, "I cannot see her day by day, I shall be nought but a dead man." Then, for the first time in their lives, there sprang up a feeling of enmity between the cousins.

This continued till one day a duke who knew Arcite, and who was an old and valued friend of Theseus, came to Athens. Hearing of Arcite's captivity, he begged Theseus to set the young Theban free. The request was granted on the condition that Arcite never again set foot on Athenian soil. For two years Palamon, still in prison, and his cousin, now at freedom, bewailed the cruel fate that divided them from the beautiful Emelye.

At last Arcite could bear his pain no longer and returned to Athens as a poor laborer. In this guise he obtained a humble post in the household of the duke. Then, one night, Palamon was enabled to drug his jailer and escape to a little wood near by, where he met Arcite. The two fell to quarreling afresh over the object of their mutual affection. At length Arcite said he would bring food and weapons, so that on the morrow they could fight for the lady Emelye.

They were engaged in this conflict when they were surprised by Theseus and his retinue. Theseus, learning from Palamon who they were, condemned both to death. But on the intercession of the ladies of the company he ordained that the two rivals should go away for fifty

weeks. At the end of such period each should return with fifty knights, to attend a great tournament, the victor in which should have the fair Emelye's hand.

The time passed, and when the hour of the tournament arrived, it was decreed by Theseus that life should not be wasted. Should either of the leaders be taken prisoner or slain, the tourney would cease. Palamon was struck down by the Indian king Emetreus in Arcite's company, and taken prisoner. But as Arcite was riding proudly to the spot where Emelye was sitting, his horse stumbled, and he was fatally injured by the fall. While lying at the point of death in the palace of Theseus, Arcite sent for Emelye and Palamon. To Emelye he said:

"Nought may the woful spirit in mine heart
Declare a point of all my sorrow's smart
To you, my lady, that I love most;
But I bequeath the service of my ghost
To you aboven every creature,
Since that my life may now no longer dure.
Farewell, my sweet! Farewell, mine Emelye!
And softly take me in your armes tweye (two),
For love of God, and hark to what I say.
I have here with my cousin Palamon
Had strife and rancour many a day i-gon
(gone by),
For love of you, and eke (also) for jealousy."

But, he went on to say:

"In this world right now I knowé none
So worthy to be loved as Palamon,
That serveth you, and will do all his life.
And if that ye shall ever be a wife,
Forget not Palamon, that gentle man."

And so a brave man died. Emelye and Palamon were stricken with bitter grief, and Arcite's death was mourned by all Athens. Even Theseus bowed his head in sorrow. None could comfort him save his aged father, Egeus, "that knew this world's changes," and said:

"This world is but a throughfare full of woe,
And we be pilgrims, passing to and fro;
Death is an end of every worldly sore."

Theseus cut down the wood where the cousins had fought, and gave to Arcite a befitting funeral. Then it came to pass, when time had brought healing to the hearts of all concerned, that Theseus sent for Palamon and Emelye. That of two sorrows might be made a perfect joy, the duke ordered that these two should take one another as husband and wife.

So, with great rejoicing, the marriage was celebrated. Emelye loved Palamon so tenderly, and Palamon served Emelye so nobly—

That never was there word between them two
Of jealousy, nor of none other woe.

THE KNIGHT AND THE UGLY OLD WOMAN

THE TALE TOLD BY THE WIFE OF BATH

A KNIGHT of King Arthur's court by an unworthy deed had earned the penalty of death. But, the Queen and her ladies gaining the King's grace, the knight was handed over to the Queen. She promised him his life if, within a year and a day, he could tell her what it was that women most desired.

Time passed sorrowfully for the knight. No satisfying answer could he discover of anyone. The day on which he was once again to appear before the Queen drew near. As he was returning from his quest he met an ugly old hag who, addressing him, inquired what it was that he sought.

"Promise me," said the old woman, when he had told her his story, "that thou wilt do the next thing that I require of thee, if it be in thy power, and I will tell thee the answer."

The knight gave her his word, and together they journeyed to the Queen's

court. Here, as instructed by the old woman, the knight declared that the thing most desired by women was power. This was the answer, and he was adjudged to have saved his life. Then up rose the old woman, and telling the Queen of his promise, asked his hand in marriage.

"Take all my goods and let me go rather!" exclaimed the knight. But he was kept to his bond. When his newly wedded wife upbraided him for his treatment of her, he taunted her with her lowly birth, as well as her ugliness and poverty. To this she replied in words that have been often repeated:

"Look who that is most virtuous alway,
Open and secret, and most intendeth aye
To do the gentle deedés that he can,
And take him for the greatest gentleman.
Christ will we claim of Him our gentleness,
Not of our elders for their old richesse.
For tho' they give us all their heritage,
For which we claim to be of high peerage.
Yet may they not bequeathé, for no thing,

To none of us their virtuous living.
That made them gentlemanly called be."

When the knight had repented of his unknighly mood, his wife asked him to choose which she should be—old, ugly and devoted to him, or young, fair, but vain and fickle. In reply the knight put himself in his wife's "wise governance."

"Then," said she, "I have the mastery. And I will be to you both fair and true." As she spoke a magical change took place; she became young and beautiful.

The knight, looking up, now saw, to his rapture, that what she said had come to pass. And the two lived to their lives' end in perfect joy.

THE DEAD BOY WHO SANG A HYMN

THE TALE TOLD BY THE PRIORESS

IT must be borne in mind in reading this tale that, at the time of which it relates, there was a great hatred between Christians and Jews. Both misunderstood one another, much as they do in Russia to-day. Few, perhaps, of Chaucer's pilgrims would have known enough to cast serious doubt on the truth of the Prioress's story, which was an old fable.

Once, in a great city of Asia, there was a quarter filled with Jewish moneylenders. The street in which the Jews lived was one through which was constant traffic. At one end of this street was a little school to which Christian children went. Among these children was a widow's son seven years of age. He had learned at his mother's knee to pray. When he heard the hymn "Alma redemptoris" (Mother of the Redeemer) sung, so moved was he that, though he knew no Latin, he soon learned to repeat the first stanza. Finally he learned it by heart and sang it regularly as he went to and from school through the street where dwelt the Jews.

Satan then stirred the hearts of the Hebrews against the little singer. They hired a wicked man to kill him and cast his body into a pit. The next day the widow sought everywhere for her son, and made piteous but useless appeals to all the Jews to tell her if and where they had seen him. They all said "Nay."

But Jesus of His grace
Gave to her thought, within a little space,
That in that place after her son she cried,
Where he was casten in a pit beside.

And hereupon the dead child began to sing the "Alma redemptoris" so loudly that all the place began to ring. The Christian folk passing through the street stopped to wonder at this marvelous thing. They sent for the Provost, and he, praising God for the miracle, had all

the Jews taken and bound, and the child's body carried to the nearest abbey.

The guilty having been punished, preparations were made for the burial of the child. All the time the voice of the boy was heard singing the hymn he loved.

"Dear child," said the Abbot, "I conjure you, tell me why you sing, since that your throat is cut."

And the child replied that, as he was about to die, Mary, the mother of Jesus, appeared to him. Here are quoted words and lines as Chaucer wrote the tale. They seem strange, as the spelling is quite different from that used to-day. It is to be remembered that the words are in poetic order.

"To me sche cam, and bad me for to synge
This antym verrailly in my deyinge,
As ye have herd; and whan that I had songe,
Me thought sche layde a grayn under my
tonge.

Wherefor I synge, and synge moot certeyne
In honour of that blisful mayden fre,
Till fro my tonge taken is the greynye.
And after that thus saide sche to me:
'My litil child, now will I fecche thee.
Whan that the grayn is fro thi tongue i-take,
Be no agast, I wol the not forsake.'"

In more modern English the meaning would be something like this:

"To me she came and bade me for to sing
This anthem verily in my dying,
As ye have heard; and when that I had sung
Me thought she laid a grain under my tongue.
Wherefore I sing, and must surely sing
In honor of that blissful gracious maiden,
Till from my tongue the grain is taken.
And after that thus said she to me,
'My little child, now I will fetch thee.
When that grain is removed from thy tongue
Be not afraid, I will not forsake thee.'"

The Abbot then took away the grain, and the boy "gave up the ghost full softly." Everyone was thereupon deeply moved. And the little martyr's body was placed in a marble tomb.

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 5027.



FLOWERING LOCUST

The common locust has such handsome foliage, and such quantities of fragrant white blossoms, that it has been planted extensively in European parks.



FLOWERING RHODODENDRONS

Rhododendrons, both native and foreign, are frequently planted in cool and shady places for their evergreen foliage and splendid heads of flowers.



FLOWERING DOGWOOD

Dogwood trees grown in the open are like small apple trees. The foliage takes on brilliant scarlet lines in fall, and the close clusters of berries are redder. The white flowers make a fine showing.



MOUNTAIN LAUREL

Mountain laurel is one of the handsomest of American evergreen shrubs, and is often transplanted to parks and gardens. Its flowers, which shade from white to a beautiful pink, generally bloom in June.



STRIKING NORTH AMERICAN SHRUBS

ONE usually thinks of a shrub as quite tall, rather like a small tree, or at least like a bush, yet some shrubs creep along the ground and others climb high into the trees. To put it as plainly as possible, a shrub is a woody plant that does not die down to the ground each winter, but keeps its side-shoots from year to year, breaking into bloom each season from buds on these shoots.

Trees, especially when growing in a grove or forest, soon lose their side-branches at the base of the trunk as they grow taller, and shoot up into tall shafts crowned by most of the branches growing in a head. Upright shrubs, on the contrary, retain their lower branches more frequently and become "bushy" in appearance.

THE TRAILING ARBUTUS, SOMETIMES CALLED MAYFLOWER

Among the shrubs that creep is one that grows in many parts of eastern North America but is particularly dear to the people of Massachusetts. It is the Trailing Arbutus. It grows during the summer, shooting out long branches that trail along the ground,

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taking root here and there. Its leaves are oval, or almost round in outline,

leathery, rigid and evergreen. By autumn, the clustered buds at the end of the hairy twigs are almost ready to open. But

they do not do so. Cold weather sets in, dead leaves drift over the plants, and, singularly protected by them, the arbutus waits until the spring sun warms it; then the flowers have but little growing to do, and soon open, among the first flowers of the season. Without doubt they were the first pretty flowers the Pilgrims found. Mayflowers they are called sometimes, and, in some localities, May-pinks.

The flowers themselves are salver-shaped, waxen, and pink or white. They have a delicious "woody" fragrance that reminds one of sweet birch or of wintergreen, the spicy little evergreen shrub that is so close a relative of the arbutus. With the laurel, the azalea and the bearberry, they both belong to a large family—that of the heaths—which contains a great many odorous white or rosy-flowered shrubs.

PINK AND WHITE AZALEA OR PINXTER-FLOWER

The lovely Pink Azalea, or Pinxter-flower, as it is quaintly known from its habit of blooming about Whitsuntide, or Pinxter, in early spring, is also called wild honeysuckle, and not without some reason, for its lovely coronets of delicately cut, long-tubed flowers, poised on slender, brittle stems, do suggest honeysuckles, except for their color. The resemblance is aided by the quintet of very long stamens and two pistils, which are thrust out far beyond the petals. This character would lead one to suppose that wind carried the pollen from flower to flower. But the pollen grains are so coated with a viscid substance that strings of them may be drawn from the anther-cells by the slightest touch of the finger. This leads one to believe that insects are the messengers desired. The rich fragrance of the pinxter-flower would also seem to be an attraction for insects. There is a white azalea that blooms in midsummer in swamps, that is still more fragrant.

THE EXQUISITE FLOWERS OF THE MOUNTAIN LAUREL

The Mountain Laurel, or *Kalmia*, however, though very closely related to the azalea, is scentless. But so brilliant is the display of bloom on this evergreen shrub, which sometimes grows ten feet or more high, that no odor seems necessary even at night. It bears great flat-topped masses of flowers ranging in hue from white to deep pink, set off, like an old-fashioned bouquet, by a salver of stiff shining lance-shaped leaves, very dark green in color. Each flower is worth studying. It is like a saucer which has a five-sided, rather than circular, rim. At each angle, and in each space between the angles, is a small pocket which projects on the outside like a little knob. Look at a newly opened flower. You will see that each one of the ten pockets has the tip of one of the ten stamens safely stowed away within it. Its filament springs in an arch from the centre of the blossom. Run your pencil over the tops of the arches. You will probably jump with surprise, for every one of those stamens has jerked its tip out of its pocket and is standing stiffly erect. Now, if your pencil had been a blustering bumblebee, he would have been well thumped by the upspringing stamens, and

well dusted by the pollen jerked out of the open mouths of the pair of quaint jugs that form the anthers. He would have flown away disgusted, and lit on another flower, whose trap had been previously sprung, perhaps, and would have rubbed off some powder on to the ready stigma.

Masses of laurel leaves are stripped from the bushes and used for holiday decoration, as they endure transportation well. One should be careful about throwing them, when discarded, within reach of young browsing animals, for this foliage contains a poison more deadly than strychnine, and many animals have been killed by eating it. Sometimes children are poisoned by eating the young seedling plants instead of wintergreen, which they much resemble, although they lack the spicy taste. Honey made from laurel bloom is also said to poison those who eat it. The narrow-leaved laurel, which is much smaller, with darker, smaller flowers, is known as sheep-laurel or lamb-kill, showing that its dangerous qualities are suspected.

THE PLANT ON WHICH THE LUSCIOUS BLUEBERRY GROWS

There is a group of relatives of these gorgeous shrubs that are very plain in appearance, crowded with little drooping white or rose-flushed, bell-shaped flowers, that in one case, at least, fairly tinkle when the bush is gently shaken. Whortleberries some of them are called in Europe, or bilberries; but in America we lump several kinds under the name Blueberry or Huckleberry, having a vague intention of calling those that are blue, with a waxen bloom like a grape, by the first name, and the shining black fruit by the other. Where these berries grow at all, they usually grow in great patches, and many women and children in the country earn many dollars each year by picking and selling the little berries that are so crowded on the branches that they may be plucked in handfuls.

The bears knew how good they were, and the Indians put them into their porridge, or into the corn-cakes they cooked by the camp-fire. Blueberries have been little cultivated until recently. In certain districts, however, large tracts are burned over very early in spring every two or three years. This kills small trees and weeds among the low blueberry bushes, which grow very quickly and



THE STRIPED MAPLE

The striped maple, or moosewood, is one of the most charming of our smaller trees, both in flower and fruit. Its buds afford a food for moose and deer.



THE BARBERRY

The common barberry bushes are not native, having been brought here from Europe, but there is a different native American species in the Alleghenies.



THE AZALEA

Azalea flowers of different varieties resemble one another very much. The pinxter-flower blooms before the leaves are fully expanded, but the white azalea comes later and is set off by leaves.



THE HUCKLEBERRY

The common blueberries and huckleberries grow thickly on low, stiff, branching bushes, the berries appearing soon after the flowers have gone. The leaves, in autumn, take on lines of scarlet.

bear their best crop the year after they are burned over. In recent years several improved varieties have been developed, and now the cultivation of this delicious berry is increasing rapidly.

SEEDS OF THE RED CHERRY CONTAIN POISON

The Indians probably could not get much comfort out of the Wild Red Cherries, for the flesh is very thin and very sour, but birds gorge themselves upon the plentiful scarlet fruit, and at least one little animal, the gray chipmunk, nibbles away at them wherever it can reach the clusters of fruit. When in flower, this slender little tree of our rocky woods is wreathed in a veil of tiny, star-like, snow-like blossoms. It would be well to regard this cherry with some suspicion, for the leaves of the more common black cherry, with racemes of fragrant flowers and of shining black fruit, are very dangerous to cattle (when partly wilted, especially), and it is probable that the other species would be equally so. And children should not swallow cherry seeds of any kind, for concealed in them is a wonderfully active and prompt poison, *prussic acid*, which may be set free in the stomach. It gives the pits the taste and odor of bitter almonds.

Blooming under the wild red cherry are the straggling bushes of the Choke-cherry, from which hang long clusters of luscious-looking scarlet berries which will pucker the mouth and throat most amazingly.

THE STRIPED MAPLE, OR MOOSE- WOOD—A MINIATURE TREE

We are all familiar with the great maples, so often planted as shade-trees, such as the scarlet, the sugar and the Norwegian kinds; but there is a delicate little maple that we rarely see, unless we travel on the mountains or in the northern forests. It is uncommon, even then, outside of the woods themselves. It seems to be happy only in thickets of low trees covering rocky hillsides. In the north woods the hunters know it as Moosewood, for those great deer, the moose, feed upon its large red-scaled buds. The other name of Striped Maple is quite apt, for its smooth dark green bark is lined up and down with delicate tracings of a white pigment that can be scraped off with the nail. It is a tree that Japanese artists would like to draw,

for its great soft triple-pointed leaves are arranged in a fine spray, and from the twigs spring delicate pendent clusters of pale yellow bells, like fragments of necklaces; and, late in summer, follow strings of pale brown winged fruits that turn to gold when the rays of the setting sun strike through them.

FLOWERING DOGWOOD FILLS THE WOODS WITH BLOOM IN MAY

In the same woods as well as those farther south, and very widely distributed, are the Dogwood trees, the name being borrowed from a small European tree closely related to it, from whose bark a healing wash for dogs used to be extracted. In May they become snowy banks of bloom, but each apparent blossom is masquerading in a white domino. In the centre of the large white petals—as those who are not botanists very naturally call them—which form the domino, are grouped the maskers or real flowers, each quite complete in itself—a pale, somewhat slender floweret, four-parted at the margin. The snowy, striking, heart-shaped leaves we have called petals are really “bracts” (a form of leaf that infolds, or closely attends a flower) which cover the flowers in the little square buds. At that time they are quite green, but gradually become white as they unfold and expand. They serve to attract insects by making the tiny flowers very conspicuous, and also provide a platform upon which flying creatures may alight, so that they may search easily for, and suck up, the nectar from the very bottom of the yellow flower-vases.

If we wish to see how the dogwood flowers would look without their brilliant bracts we may search in thickets or in woods for other varieties, mostly low shrubs. Some of them are quite common along roadsides, while others, and especially the Round-leaved Dogwood, prefer shady and rocky woodlands. The latter has a flat-topped cluster of starry flowers a little larger than those of the flowering dogwood, and quite white, but it has no brilliant bracts.

THE BARBERRY WHICH CAME FROM THE OLD WORLD

Along roadsides we may find the Barberry, a tall bush, very straggling in its growth and crowded by a host of suckers. It has come from the Old World, but has become so much at home here that we forget that fact. It throws



WILD CHERRY

Birds are exceedingly fond of the small tart drupes of this tree, which is common in rocky woods. Its delicate white flowers are borne in great profusion.



ROUND-LEAVED DOGWOOD

This shrub grows in rocky, shaded woods, where its small white flowers in clusters are effectively set off by the round leaves. The fruits are light blue.



THORN-APPLE

The thorn-apples are not properly shrubs, since the rank branches are killed each winter. The small seeds that slip out of the ripe fruit are poisonous.



TRAILING ARBUTUS

This evergreen shrub is often called Mayflower or May-pink. It is also known as gravel-plant on account of certain curative powers it is said to possess.

out long, slender and brittle branches, studded with tufts of small, obovate or spatulate leaves; but as soon as we pick a spray we discover that it is very fully armed with sharp spines that point in every direction. They are leaves that have been transformed entirely into spines like those of the cactuses. In autumn the ordinary foliage falls off, but the spiny leaves remain, ready to keep browsing animals away from the tender, growing twigs.

Racemes of pretty yellow flowers droop from the tiny barberry shoots in spring, in which the nectar is produced in saffron-colored swellings, on the petals, and also on the filaments of the interior circle of stamens; for the six pollen-bearers stand in two whorls, slanting outward and lying in the concave faces of the similarly placed petals. The bases of these stamens are very sensitive, and when a bee flies upward to the drooping flower—that, like a roof, protects its stamens from rain—and plunges her feet or proboscis therein, seeking honey, she sets off a trap, as it were. The stamens fly upward at the slightest touch, toward the stigma, and tap the bee smartly on the head, snapping open the little trap-doors at the top of the anther, and powdering the visitor thoroughly with pollen. The later racemes of oval scarlet berries droop from the bending branches during almost the whole winter. They are very acid—too tart to interest many birds. But they make delicious preserves, with a very distinct flavor.

THE BEAUTIFUL FLOWERS AND FEATH- ERY LEAVES OF THE LOCUST

The tulip tree grows best in damp soil, but the Locust thrives best in dry and sandy land. It has a somewhat tropical look, reminding one of the African mimosas, for its leaves are divided into many rounded leaflets. Its spray, seen against the sunset light, looks like delicate seaweed, and the tree itself, when uninjured, suggests instantly the gray-tinted ones seen in the landscapes of the older French painters, or of Corot. However, the flowering locust is rarely seen in fine condition, for its branches are extremely brittle, are usually injured by borers, and some are likely to crash down in every storm. In June it is a glory of bloom. Great clusters of racemes of pea-like flowers droop from every branch, white, with golden hearts—an American

rival of the Japanese wistaria with the added virtue of very great fragrance.

But one must approach the tree with caution, for it is defended by vicious thorns, while stray thorns are scattered here and there on the main trunk, even near the ground, where we do not expect them. Brittle as the branches are, the wood, when properly seasoned, withstands decay admirably, especially when in contact with the soil, and is greatly sought for fence-posts.

Even more tropical in appearance than the locust is the Stag-horn Sumac with its crooked branches covered with thick, soft hair, not unlike the velvet of a young deer's horn. Its closely set pyramidal masses of acid fruits are also wrapped in crimson plush, as well they may be, for they crown the awkward brittle stems until spring, or as long as the birds will let them stay. Although sour and dry and velvety and difficult to swallow, they offer a sort of hard, un nourishing food to many a bird hard pressed by hunger in the winter season. Chickadees fairly haunt them, and cheerily peck the pyramids to pieces.

POISON-SUMAC IS DANGEROUS TO TOUCH

While we are prowling about the margins of swamps looking for the pin-oak, we must take care not to run into, or handle, the Poison-sumac, or Swamp Elder, as it is sometimes called. It is most dangerous in early summer, for then the flowers are opening, and even the flying pollen seems to be quite able to cause that itching inflammation of the skin which tortures some people so greatly, whether caused by the poison-ivy of the fence-posts, or by its relative the poison-sumac of the swamps. This is a shapely shrub or small tree, which often grows among alders and elders. Its rather long and bare, slender limbs bear at the top a great cluster of leaves composed of from seven to thirteen pointed leaflets. These *stand up* from the mid-rib in a way that is quite unlike the attitude of the leaflets in other trees. They are very glossy, of an odd shade of dark green above, and have red stems, while the mid-rib from which they spring is also red. This is a point to be remembered. The little green flowers fall loosely in long spray-like panicles from the axils of these leaves. In the fall the leaves very early change to unusually



THE BITTERSWEET

There are two vines called bittersweet. This one, with beautiful scarlet and orange berries, is quite harmless, although the other is considered poisonous.



POISON-IVY SPRAY

It should be remembered that the poison-ivy may affect the skin even in winter, when all the leaves have fallen, if the fruit or twigs be handled.



POISON-SUMAC

A shrub or small tree which grows in swamps, that is to be avoided. It is poisonous to the touch. It has upstanding leaflets on red stems, and white berries. The foliage turns a beautiful red in autumn.



POISON-IVY BERRIES

This shrub may be easily recognized in winter by its grape-like dry clusters of white berries, and in summer by the entire-edged upstanding leaves on red stems. The fruit of the common sumac is red.

brilliant shades of orange and vermillion, and when they have fallen to the mud, grape-like clusters of white berries still grace the tops of the branches, tempting birds to eat them, and occasionally, I fear, tempting young folks with an eye for winter decoration, to pick them—with sad results—for root and branch, winter and summer, the poison-sumac is poisonous to the touch. Practically the same thing can be said of its more common cousin, the poison-ivy, which crowns fence-posts and old stumps and rears its slender branches among the thickets. This, however, has only thin leaflets, without the warning red stalks, but has the same gloss on its dark green leaves, and assumes the same brilliant autumnal coloring.

W. H. Gibson has given us a catchy little jingle about the sumacs which may help us to remember the important differences between the poisonous and harmless sumacs.

Berries red,
Have no dread!
Berries white,
Poisonous sight!
Leaves three,
Quickly flee.

One should be cautious, moreover, in going to the leeward of a fire in which the poison-shrubs are burning, and should never chew bits of wood without first examining them; the smoke from the burning, or the chewed-up splinter of bark may result seriously even for persons who are not usually affected.

POISON-IVY SHOULD ALWAYS BE SHUNNED

Although not quite so virulent as the swamp or poison-sumac, the Poison-ivy, its close relative, is quite as dangerous. It is much more common, springing up in many an old field and woodland clearing, and climbing upon roadside fences, where it thrusts out its short branches into the faces of the passers-by. It climbs by means of rootlets protruding from the bark, and each leaf is made up of three leaflets of an irregular lobed, ovate outline. The number of leaflets is to be remembered, for the poison-ivy is frequently confused with the innocent five-leaved Virginia Creeper or the ampelopsis. The spreading of the poison-ivy is due largely to the birds, which devour the berries eagerly, pallid, hard-shelled and unappetizing as they look to

us. Some of the seeds passing through the bodies of the birds fall uninjured and proceed to sprout.

THE BRILLIANT BERRIES OF THE BITTERSWEET

A much more gaudy climbing shrub is the Bittersweet, that sometimes shares the fence-posts with the poison-ivy. During the summer one hardly notices the pale vine, as it climbs by twisting its supple branches around trees and other supports. One will sometimes find small trees in a grove, with a swollen portion around which a welt or groove winds spirally. This is a sign that some vine, and usually a bittersweet, has inwrapped the growing sapling so firmly that it has nearly strangled it, and forced it to grow in an unusual manner where the vine pinches, just as one's finger swells about a tightly tied string. Shade, or the up-growing of the tree, generally kills the vine, and leaves the sapling free, but sometimes fragments of bittersweet are imbedded in the bark. In fall the orange-colored berries of the bittersweet split into four portions that bend backward and leave exposed a fleshy scarlet sphere called an aril, that covers the seeds. Scarlet and yellow placed together make each hue more brilliant, painters say, and doubtless these gaudy berries catch the eye of the birds, and are carried afield by their means, as are those of the poison-ivy.

THE DANGEROUS THORN-APPLE, SOME- TIMES CALLED JIMSON-WEED

Near the end of this very short list of shrubs I put the Thorn-apple, for it really is not a shrub at all, since each year the stalks are laid low by frost. However, it looks so much like a great widely branching true shrub, and it is so dangerous, that I shall speak of it here. 'Its unshapely, lobed, dark green leaves, rank in odor and arranged in clusters separated by long spaces of bare stem; the toughness of its branches; and above all its morning-glory-like flowers that bloom at night, and round spiked fruit, make it easily recognized. An interloper from the tropics, it thrives very well on our dust-heaps and roadsides and grows rankly, forming thickets on the vacant lots of cities. There are two common sorts, one bearing exquisitely white flowers; the other, blossoms with violet corollas, and having purple stems and shades in its foliage.

The Thorn-apples, or Daturas, are sometimes called Jimson-weed, a shortened form of Jamestown weed. They are so called because soldiers eating its young sprouts near Jamestown, Virginia, in colonial times became delirious and acted as if half mad. This was because, while not poisonous to the touch, the thorn-apples are poisonous when eaten. Large amounts throw the victim into a fatal stupor, but in slighter quantities induce delirium. Luckily, the fruit is not very tempting. The green, fleshy, ball-like capsules soon become dry and brown, and are thickly beset by long but not very sharp prickles. It soon splits open downward from the top, usually into four pieces, and the thin little black seeds can be plainly seen. These are the most dangerous parts of the plant, and children should be warned not to nibble them.

WHERE SHRUBS ARE MOST OFTEN FOUND

It is the shrubs that form the thickets that make an attractive and sheltering border along the outskirts of the woods. They flourish in a continuous fringe by the banks of country streams, arching over the currents and reaching out on the sunny side into rounded masses of foliage. Standing upon a hill-top, one can trace the winding course of streams whose water cannot be seen at all by the green cushiony line of bushes that marks their course. Such thickets are the favorite resort of small birds, which find among their recesses plenty of the insects or of the small fruits upon which they feed, while they feel safe among the close twigs where they cannot easily be seen by hawks or other enemies. Few small birds spend much of their time in the tall trees, and so they seek the thickets of shrubs.

Here, too, insects, snails and such small creatures live in the shaded soil and decaying leaves. These attract the toads, wood-frogs and turtles; and after them go snakes and various of the smaller mammals, wandering rabbits, woodchucks, raccoons, foxes and so on.

HANDSOME RHODODENDRONS AND OTHER EVERGREEN SHRUBS

Although the Himalayas appear to be the home of most species of Rhododendrons, America possesses several of these lovely flowering shrubs. The most beautiful ones live chiefly on mountains, occa-

sionally creeping down into cool shadowy glens of the lowlands. They arrive at their greatest size, that of small trees, in the southeastern mountains, where they are called "laurel," or rose-bay. They bear great clusters of pink or white spotted flowers, jutting out from massy foliage of dark, shining evergreen leaves.

Another evergreen shrub of the South is the climbing Smilax, closely resembling its relatives the catbriers of the North. The twining stems, set with stiff leaves, are frequently sent North for Christmas decoration, along with the prickly foliage and scarlet berries of holly.

The Black Alder of swamps, which loses its foliage, but is strikingly adorned with close-crowded vermilion berries, belongs to the Holly Family, like the gay Winterberry, the Ink-berry and the inconspicuous Cassine, or Yaupon. The leaves of the last-named are dried and used as a tea in some places. They were formerly used by Indians for brewing the sickening "black-drink" with which they ceremonially dosed and purified themselves. The leaves of the New Jersey Tea, a widely branching little shrub, every twig tipped with bunches of tiny white flowers, were said to have served in an infusion, for a beverage; but the use of Labrador Tea, woolly and astringent, appears to be more frequent in sub-Arctic regions.

The West has a shrub, the Mahonia, "which looks like a holly, fruits like a grape, and is a barberry." It is frequently seen in modern shrubberies, but although evergreen in its own home, will lose its foliage in the North if not protected, thus unduly exposing its blue fruit. In the warmer parts of California are found also the Manzanitas, very conspicuous among other shrubs of the chaparral on account of their smooth red branches, pale foliage and large dark red berries.

The Witch-hazel, that sprawls in young forests, has flowers like rosettes of tiny golden ribbons. Both bark and leaves contain a great deal of tannin. An extract of the bark is much used to bathe tender skins and sore muscles. Not so long ago many people believed that a forked twig of this shrub properly held in the hands was able to point out where a supply of water could be found near the surface of the ground.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 4871.

THE SUEZ CANAL FROM THREE POINTS



Here we see the Suez Canal as it enters Lake Timsah, near Ismailia. This famous canal is a hundred miles long, passes through several lakes on its way to the sea, and cost \$100,000,000 to make.



Dredging operations are constantly necessary to keep a way open for ships through the Suez Canal, and this photograph shows a suction dredger depositing inside a wall the sand it brings up from the water.



If a ship is wrecked in a narrow channel like the Suez the delay is very serious. This picture shows how the remains of a wrecked vessel are blown up to clear the channel.



Locks on the Caledonian Canal at Fort Augustus.

CANALS AND HOW THEY WORK

A CANAL is an artificial waterway. Sometimes it is made by improving or enlarging a natural waterway, so that we get what may be called a "canalized river." In other cases a clean cut is made where Nature gives little or no assistance, and then tremendous feats of excavation have to be undertaken.

The channel of an artificial waterway is made with sloping sides and a flat bottom. It is very important to prevent the falling-in of the sides, and they are often faced with stonework. The canal is sometimes made water-tight by lining it with what is called a puddle of clay—clay cut into slices and well mixed with water. In this condition it is applied in layer after layer for a thickness of several feet. Big waterways are sometimes lined with concrete.

There is one very important difference between the making of railways and of canals. A railway engineer can use a certain slope, or grade, for a railway train can be drawn uphill or downhill, but a water engineer has to work on the level, because water always comes to a level.

A canal, therefore, must either be one dead level throughout its length, or divided into sections of different levels. Each section must be a dead

CONTINUED FROM 4678

level connected with its neighbor by an apparatus enabling a boat or ship to be

moved up or down from one level to another. This apparatus is called a lock. The immortal artist and scientist

Leonardo da Vinci is said to have been one of the first engineers to make a lock.

A lock is a water-tight chamber constructed at the end of the lower water level, with its top reaching a little above the water surface of the upper water level. At each end of the lock are heavy gates which can be moved only when the water level is the same above and below. These gates meet at an angle upstream. The water, pressing against the gates, shuts one against the other, and so makes them water-tight. There are small sliding gates, or sluices, in the lock gates or walls near the bottom, which can be opened to allow water to pass through, although the main gates remain shut.

Suppose a boat, ascending the canal, arrives at a lock on its way to the upper level. First, assuming the lock to be full, the upper gates are closed, and after the lock has been emptied the lower ones are opened. The boat then passes into the lock chamber, and when it has entered, the lower gates are shut. The position then is that the boat is still on the lower level, but

locked in between the upper and lower gates.

Next the sluices in the upper gates are opened, and so water pours into the lock.

As the lock fills with water the boat rises until, the lock being full, the boat has risen to the level of the water of the next section. Then the upper gates are opened and the boat passes out. It is a very simple and efficient idea, and it made a great difference to canal engineering.

It is one thing to cut a canal and another thing to fill it with water. To maintain a water supply sufficient to carry a canal through the driest seasons is sometimes no easy matter. If the engineer is unable to harness a natural stream to fill his canal, it becomes necessary to fill great reservoirs to keep it full. In these respects each canal is a separate problem, the solution of which depends entirely on local circumstances.

A CANAL CHANGED SMALL PLACES INTO FLOURISHING COMMUNITIES

In Great Britain a great deal was done, before the invention of railways, to carry goods on artificial waterways. In 1761 the Bridgewater Canal was cut from Worsley to Manchester. The Duke of Bridgewater employed a clever engineer, James Brindley, to do the work. Before the canal was cut Manchester had only 20,000 people, while Liverpool was a small village. The Bridgewater Canal helped to change two small places into great and flourishing communities. The canal still exists, and its success led to the construction of many more waterways. North, south, east and west canals were made with great vigor, and the British canal system to-day was for the greater part made between 1761 and 1830, in the time of the beginning of railways. But the railways came, and canal development stopped. Since 1830 nothing has been done with British canals save the making of the Ship Canal which has done so much for Manchester.

CANALS THAT HAVE HELPED ON THE TRADE OF EUROPE

Germany has some fine natural waterways, and the carrying power of her rivers has been much increased by linking them up with canals. She has over six thousand miles of really important waterways, capable of being navigated by very large vessels. Big barges, each carrying hundreds of tons, move on

them under their own power. The effect on German industry has been indeed remarkable. Along these great canals there have grown with amazing rapidity splendid industrial establishments fed by raw materials cheaply transported. It is not too much to say that the development of canals in Germany has accounted for an appreciable part of her modern industrial growth, and that that growth could not have taken place without it.

To take one case out of many, the Dortmund-Ems Canal, connecting the mining and industrial centre of Westphalia with the great port of Emden on the North Sea, was completed in 1899. In the next year 470,000 tons of goods were carried on it. Two years later this figure had doubled, and in six years it had been multiplied by four. Such are the wonderful changes which good and cheap transport brings to a nation.

France, Belgium and Holland have also done much waterway engineering. Belgium has about 1,250 miles of canals, and France 7,500 miles of canals and navigable rivers. The total number of miles of canals in the world is about 26,000, of which Europe has 13,293 miles, the United States 4,479, and Canada 535, approximately.

Among the great waterways of the world, the Suez Canal will always rank as a brilliant achievement. Anybody looking at a map may see what a narrow neck of land separates the land of Western Asia from Egypt. Comparatively small as it was, that neck compelled ships sailing eastward from Europe to Asia to circumnavigate Africa, so that a voyage of thousands of miles was made necessary by a neck of land a hundred miles across. This meant a great waste of time.

For many years the problem of cutting through this land occupied the minds of engineers, including George Stephenson. At last the Frenchman Ferdinand de Lesseps drew up a practical scheme, and in 1859 work was started on it. In about ten years the canal was opened and was afterward much improved. It is 99 miles long and it has no locks. It is cut to sea-level, so that ocean ships can navigate it. Its depth is thirty feet, and it has, of course, sloping sides, the top being 300 feet wide and the bottom 262 feet wide. It cost nearly \$100,000,000, and about 80,000,000 cubic yards of soil were dug out.

NORTH AMERICA HAS MANY ARTIFICIAL WATERWAYS

The first canal built in the United States was at South Hadley, Massachusetts, in 1793, and was constructed to overcome the danger of the rapids on the Connecticut River. It had two levels. These were connected by an incline on which boats were raised or lowered in a tank filled with water and moved by cables worked with water-wheels. But while this was the first canal in the United States, it was small and unimportant when compared with those built

Ontario, vessels of small size can pass from the Gulf of St. Lawrence to the Gulf of Mexico. Another interesting canal is the Chesapeake and Ohio, which was planned to make the Potomac navigable as far up as possible. The original plan for this canal was put forward by George Washington. The Hennepin Canal in Illinois and the New York State Barge Canal are the latest barge canals built in the United States proper.

It seems strange that transportation by canal has not proved a success in the United States, but of the 4,500 miles



Photo, Underwood & Underwood.

The wonderful locks of the Gota Canal at Trollhatten, Sweden, a very remarkable series of steps by which vessels mount the hill.



A flight of locks in Dordogne, France, by means of which boats can gradually reach a high level. The locks are close together to overcome the grade.

later. The greatest of all canals in the United States proper is the Erie Canal, connecting the Hudson River at Albany and Troy with Lake Erie at Buffalo. The story of this celebrated waterway is told on page 4881. Champlain Canal, built at the same time, was really part of the Erie system.

Then began an epidemic of building waterways. The Lehigh Coal, Oswego, Chesapeake and Delaware, Cayuga and Seneca canals were of that period. The Illinois and Michigan Canal was begun in 1836 and completed twelve years later. By means of this waterway and the Welland Canal between Lakes Erie and

constructed, over half that number of miles have been abandoned. The greatest canal belonging to the United States is, of course, the Panama Canal and about this you may read on page 361.

In Canada is to be found an important and widespread system of canals. A series of artificial waterways, beginning with the Lachine Canal and including the noted Welland Canal, makes it possible for ships to sail from Montreal to the head of Lake Superior. Other important Canadian canal systems are the Ottawa and Rideau, the Richelieu and Champlain, and the river Trent.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 4905.

A CANAL CUT THROUGH THE SOLID ROCK



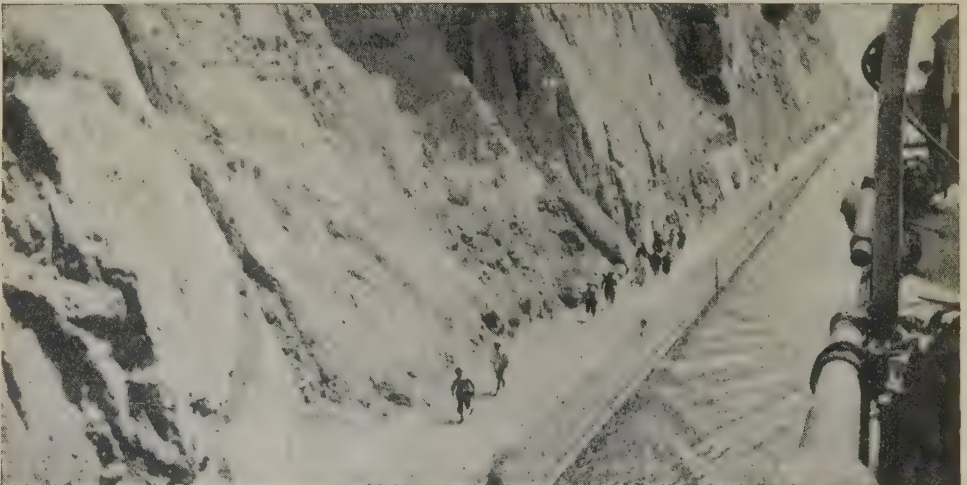
The famous Corinth Canal is cut across the Isthmus of Corinth through the solid rock. It was begun in 1882 and opened in 1893. The Roman emperor Nero began such a canal nearly nineteen centuries before.



This photograph was taken on a ship passing through the Corinth Canal. See the steep sides.



Here is another view inside the Corinth Canal, the total length of which is $3\frac{1}{2}$ miles.

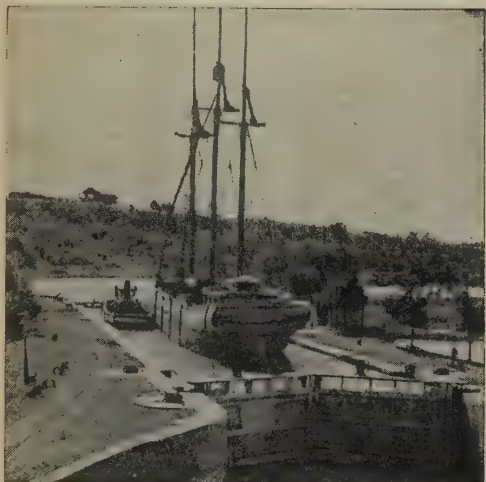


Greek children, like children everywhere who live by waterways, are fond of running on the path by the side of the Corinth Canal and keeping up with the ship as it passes slowly through.

SCENES ON FOUR GREAT CANALS



The Manchester Ship Canal connects Manchester with the Mersey estuary and enables seagoing vessels to proceed direct to the cotton metropolis. The canal was opened in 1894.



A lock on the Welland Canal in Canada. The canal is 27 miles long. © Underwood & Underwood.



Barges held up on the Warwick and Birmingham Canal owing to a shortage of water.



The Kiel Canal, which joins the Baltic and North seas, was begun in 1887 and completed in 1895. Twenty years later it was reconstructed. It is 61 miles long and has no locks. © Underwood & Underwood.

HOW A SHIP GOES UPSTAIRS



Here is a steamboat climbing a steep hill by means of a staircase consisting of a series of locks on the Bandak Nordsjo Canal in Norway. The man who invented the lock system was a great benefactor of mankind.

© Underwood & Underwood.

CONTRASTS IN CANALS



Here we see a steamship entering the Suez Canal at Port Said. The picture shows us that there is no marked difference in level between the ends of the canal. This canal is known as a "sea-level" canal.



A barge floating into the Anderton lift from the Trent Canal, which is fifty feet above the river Weaver. When the barge is inside and the doors of the lift closed the whole apparatus is lowered to the river below.

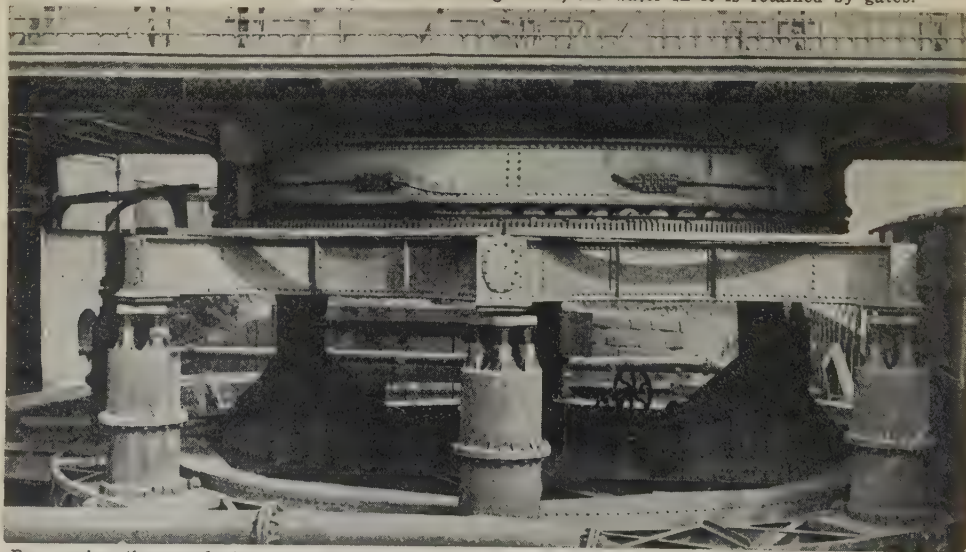
ONE CANAL PASSES OVER ANOTHER



The Barton Aqueduct, the first navigable aqueduct ever built in England, was constructed when it became necessary to find some way of allowing big vessels to pass under the Bridgewater Canal.



This picture shows the Barton Aqueduct from the top, with barges crossing on it over the Manchester Ship Canal below. When the aqueduct is swung round, the water in it is retained by gates.



For moving the aqueducts and swing-bridges which cross canals powerful machinery is required. This picture shows the apparatus by which a swing-bridge over the river Weaver is moved.

HOW A SHIP IS TOWED ALONG A CANAL



Here is a scene on the Maldon Canal at Beeleigh, in Essex, England, showing a horse drawing a barge.



On the Panama Canal electric locomotives on the banks do the towing through the locks.

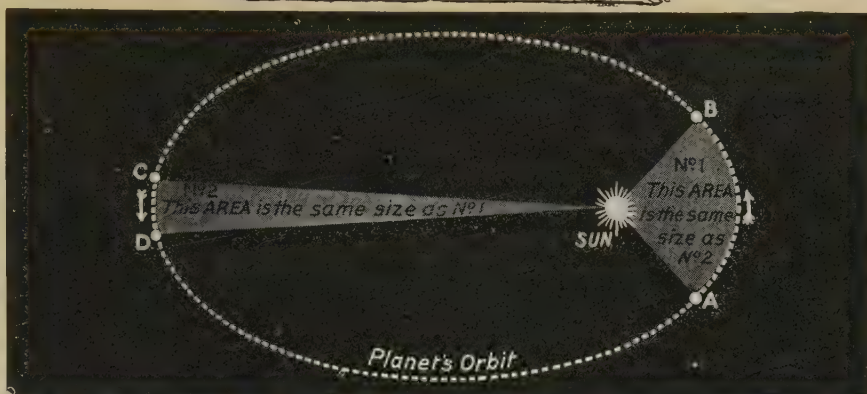


In Germany a curious kind of tractor running on rails draws a string of barges. Pictures of canals are by Messrs. Frith, Valentine, Underwood & Underwood, and others.

A TOWER THAT HAS LEANED FOR 800 YEARS



The tower of Pisa, in Italy, has been leaning for eight hundred years. When the builders found it was sinking on one side, they went on building it so that its weight fell in the right direction, and so, though the tower seems to be falling, it is perfectly balanced. This illustrates the law of gravitation, which says that everything gravitates, or is drawn, to the earth. The weight of the tower is drawn to the earth; if it were on one side, the tower would fall. However dangerous it may look, the tower is perfectly safe so long as the pressure of the tower is straight toward the earth.



This diagram explains Kepler's law, which led to Newton's discovery of gravitation. A planet moves along the boundaries of equal areas in equal times, and so moves from A to B in the same time as from C to D.

WHAT GRAVITATION MEANS

NEWTON'S three laws are called the Laws of Motion. There are three laws discovered by Kepler which led up to them and which we should consider here. Kepler's three laws are called the Laws of Planetary Motion. They deal not with motion in general, but with the movements of the planets.

With immense labor, continued for many years, Kepler showed that all the planets which were then known moved according to certain laws, their speeds depending on their distance from the sun, and so on. There was no obvious connection between the three laws; there were simply three facts about planetary motion that were found by him and put down one after the other. But when the mind of Newton considered these facts he saw that there lay hid in them the Law of Gravitation, on which they all depend.

This law is responsible for perhaps the greater part of all the motion in the world. It is the law, as Herbert Spencer said, *by which the universe is balanced*. If the different bodies that make up the universe were still, and were balanced by the law of gravitation, that would be wonderful enough; but they are all in motion, and are yet controlled.

This great law explains the motions



of the heavens on one great principle, which applies equally to the motion of an apple falling from a tree, and of the moon around the earth, and the other planets around the sun. But, said a great philosopher, we shall never be able to tell whether gravitation exists among the stars. We have now proved, however, that it does exist there also. We can tell the mass and the distance of stars which have never been seen by the motion they produce through gravitation in stars that we can see.

No question of distance, then, destroys the working of this mighty law that every portion of matter in the universe attracts every other portion of matter with a power that depends on the amount of stuff which is being attracted, and on the distance. This law would alone suffice, if necessary, to make the universe really one.

All things by immortal power,
Near or far,
Hiddenly
To each other linkèd are,
That thou canst not stir a flower
Without troubling of a star.

This is how a poet has expressed it, and his lines make it beautifully clear for us. The same poet, Francis Thompson, has said the same thing still more finely:

I do think my tread,
 Stirring the blossoms 'in the meadow-grass,
 Flickers the unwithering stars.

THE GREAT FORCE OF GRAVITATION THAT NOTHING WE KNOW CAN STOP

A very serious question for us is whether this great law can be at all changed or altered in its working. We have evidence that distance does not destroy it at all, but if we come back to earth and study the working of gravitation in the laboratory, can we affect it there? For instance, if we put something in between two other bodies, do we interfere with the gravitation between them; or does gravitation take no notice of obstacles? The answer to this is that the gravitation between two bodies is exactly the same. Their weight and motion are unaltered by the presence of any obstacle between them.

Whether through air or water or space alone, whether through blocks of granite or anything else, the power of gravitation is the same. If no distance and no obstacles interfere with gravitation, what would be the result of heat? If we take a thing that has a certain weight owing to the earth's pull for it, and its pull for the earth, and if we examine this thing, first when it has been made fifty times colder than ice by being plunged in liquid air, and then when it has been made white-hot, we find that the influence on the force of gravitation is nothing.

ATOMS OF MATTER THAT WEIGH THE SAME WHETHER BOUND OR FREE

We have failed to abolish gravitation by distance; we have failed to block it by any obstacle; we cannot affect it by temperature; but what will happen if we take certain weights of two elements, like oxygen and hydrogen, and combine them to make water? Does chemical combination affect gravitation? Do all the atoms of different things weigh exactly the same, whether they are independent of each other or whether they are powerfully bound to each other? The answer is that chemical combination has no more effect on gravitation than anything else has.

Other ways of trying to affect gravitation have been experimented with, but they have all failed. We know of nothing that will cause this force to turn one hair's breadth either way from its appointed course. There really seems to be no way of getting hold of gravitation.

No method ever tried has enabled us to modify it at all. Most people do not in the least understand what this means, however.

In a celebrated discussion last century, a very well-known man declared that he was defying the law of gravitation when he held an apple in his hand and prevented it from falling; but he was opposing force with force, and as long as the law of gravitation acted he had to pay his price every moment for holding up the apple. Exactly the same applies to airplanes. The force of gravitation is always acting, and the flier, like the bird, has to balance this force by some force acting in the opposite direction. The bird gets this force by burning sugar in its muscles; the airplane gets it by burning gasoline in its engines. If in some way we could control gravitation, the problem of flight would be solved.

THE MYSTERY OF THE FORCE WE KNOW AS GRAVITATION

But not only are we unable to control gravitation, we cannot begin to understand it. We can measure it to a nicety, but as to why it acts we know nothing. There are at least twenty-four theories on the subject, and any one of them may be true; but just because we cannot influence gravitation in any way, we can test none of the theories. There are signs, nevertheless, that an examination of the movements of the forces which bind matter into atoms may yield information on the way in which these forces in suns and planets may exert an influence outside themselves. In other words, we may learn how masses of matter, especially when in motion, can set up fields of force outside themselves. From this it may be but a step to show how these fields of force give rise to the attractions of gravity, and why their influence extends through space from star to star.

At present, however, about 250 years after the discovery of gravitation, we can only say that while we have proved the truth of Newton's law, and its independence of every kind of condition that we can imagine, we know no more of the cause of gravitation than he did, and he knew nothing at all.

Though we do not understand the cause of gravitation, we have been able to observe its results and turn such results to our advantage in mechanical ways.

THE NEXT STORY OF THE EARTH IS ON PAGE 4901.



Boats at anchor in the Dardanelles.

THE RISE AND FALL OF TURKEY

THE rise of the Turkish Empire, if we consider the forces working in the minds of men which really brought it about, takes us back to the sixth and seventh centuries.

At that period a young man belonging to an Arab tribe was growing up in Arabia in a poor and adventurous way. He was a reformer, for he taught the Arabs to give up idolatry and form themselves into one nation. His new religion taught that there is but one God, that both the Jewish and Christian religions had come from God, but that he, Mohammed, was sent to teach a more perfect faith and force it on the world.

Mohammed sent a sort of circular letter to the kings of the earth calling on them to embrace this faith, and the Persian king answered that he would put the Prophet in chains when he had time. Heraclius, the Byzantine emperor, made no direct reply to the letter, but sent some small presents.

It is almost impossible for us to realize the force and fury with which the followers of Mohammed, catching the fire of his tremendous enthusiasm, set forth to conquer the world by the sword. They did not fear death: they rather wanted to be killed if only they had slain an "unbeliever" first, for they firmly believed they would then

CONTINUED FROM 4692



be sure of happiness after death in the world to come.

It was this fierce spirit in the Saracens (for so they were called as they spread, conquering, far and near) which caused them to be so

greatly dreaded. Province after province fell to them, including Jerusalem. The magnificent walls of Constantinople saved that city for another three centuries, but nearly all the time the emperors of the East were engaged in fighting the followers of the Prophet.

During these years the Roman Empire had fallen into two parts, the Eastern and Western, the former having Byzantine (later Constantinople) for its capital and the latter Rome. Then, too, the Roman and Greek churches were drifting wider apart. Latin ceased to be a common tongue, and the Roman element became less strong. Greek language and literature were more widely cultivated.

For, besides the struggle with the Mohammedan Saracens and the Turks who followed them, the empire was beset with wild tribes pressing in from the north. Among these tribes were the Seljuk Turks from beyond Persia, who, having become Mohammedans, gained Palestine and Asia Minor. In Jerusalem was a treasured piece of wood believed to be a part of the Cross, and to rescue it Crusades were

started in Western Europe, and went on for many years. But, so far from being able to rescue the land sacred to Christians from Mohammedan power, the Christian people of Western Europe were busy quarreling with one another, and the Turks saw the opportunity for attacking Constantinople, the seat of Christian authority in the Eastern Empire.

THE GATHERING OF INVADING TRIBES INTO THE GREEK CHURCH

Unhappily, differences arose between the Churches of the East and West, and so it came to pass that, as Christianity spread over Europe in the centuries when the wild peoples were settling down, these peoples joined either the Western Church, with the Pope as its head, or the Eastern or Greek Church, ruled by the Patriarch of Constantinople.

We have seen that the English, French and Germans were converted by missionaries from Rome; but the Slavonic peoples, and others of different stock who became very much mixed up with the Slavs, had most to do with the Eastern Empire, and so took their Christianity from the Greek Church. Chief among these peoples were the Bulgars, who settled between the Danube and the Balkans, and whose kingdom now reaches over the southern slopes of the mountains, and the Serbs, who settled to the west of them in Serbia. Many were the struggles between the Eastern emperors and these settlers on the northern boundaries of their dominions, who eventually became Christians within the Greek Church, but still with dividing jealousies.

Constantinople in those days was becoming more and more a city-state instead of the heart of an empire, as it had been in earlier years when it became the seat of Christianity in the East.

THE THRILLING JOURNEY OF A PRINCE OUT OF ASIA INTO EUROPE

At this time a fresh incursion of Turks, called Ottomans, from their leader Othman, joined in the contest between Mohammedanism and Christianity with an intense vigor, and secured a firm foothold in Asia Minor, on the opposite shore of the Bosphorus to Constantinople. From this point of vantage it was not difficult to cross into Europe.

The story of how the Turkish crown prince with eighty men crossed into Europe on rafts is most thrilling. At the

narrowest part of the Dardanelles, no wider than a good-sized river, they succeeded in planting a fort, the foothold of the Ottoman Turks in Europe. Before many years had passed towns, villages and valleys fell to the conquerors—even Adrianople, the second city of the empire, fell. Several causes helped. The rulers of the old empire were weak and foolish; the Balkan Christians were fiercely destroying one another while the hour of their doom was coming nearer; and the other peoples around, the Venetians, Genoese, Hungarians, Poles, Austrians, were too disunited, or too busy with their own affairs, to join forces against the invaders at their gates.

Sigismund of Hungary headed a force when the Turks burst through the Balkans; but they were too strong for him, and, besides, he was much taken up with persecuting John Huss of Bohemia. Later the brave John Hunyadi, with the Poles, defeated the Turks, but was afterward in his turn defeated at Kossovo.

THE SONS OF THE CONQUERED PEOPLES WHO FOUGHT FOR THE TURKS

The Turks had now determined to have Constantinople for their capital, so all the time they were increasing their ships and their army. One way of strengthening the army was to make the conquered peoples give up the finest of their boys. These boys were brought up as Mohammedans, and drilled to fight against their own countries. These troops were the famous Janissaries, or new soldiers, who helped so largely to destroy the Eastern Empire, and gained so much power over the sultans.

The ruins of the walls of Constantine's city show how strong were the defenses when the last emperor stood bravely in the breach against Mohammed II. He knew the end was near, and at midnight had taken the Sacrament in the beautiful Church of St. Sophia. Then after a short rest in his ruined palace, he sadly mounted his horse and rode away, amid the sobs of the crowd, to the post of danger.

Before long the besiegers made their entrance over his dead body. The streets were deserted, for the people had gathered in St. Sophia in frantic prayer, expecting a miracle to save them. Alas! a piteous wailing went up as they were dragged out to be killed or were sent into slavery, and then, only a few hours after the celebration of Constantine's last

SOME FAMOUS RULERS OF BYZANTIUM



Legend says that, being blind and poor, Belisarius, a great Byzantine general, wandered about with a guide, and the youth being killed by a snake, Belisarius carried the body, not realizing he was dead.



The emperor whom Belisarius served was Justinian the Great, who married a dancer named Theodora. Theodora was beautiful, but although wise and courageous, she was also arrogant and cruel.



Desiring a wife, the emperor is said to have called the most beautiful maidens to his palace, and with a golden apple to give to the lady of his choice, he chose Casia; but by a pert reply to a remark of the emperor she offended him, and passing on, he chose Theodora for empress, giving her the apple.

act of worship, the loud voice of the Mohammedan crier rang out through the huge building: "God is great, and Mohammed is His prophet." It was on May 29, 1453, that the great church of Christianity passed into the hands of its enemies.

St. Sophia still stands in its grandeur, and many of its beautiful mosaics tell of its Christian past, though for more than four centuries it has been used as a Mohammedan mosque.

THE FLIGHT OF THE LEARNED MEN AND THE BIRTH OF THE NEW LEARNING

THIS conquest by the Turks of the old Greek Empire, and particularly the fall of Constantinople, caused the flight of many students and learned men, with the manuscripts they so much loved, toward the West, chiefly to Italy. In Florence, Lorenzo the Magnificent gathered round him men who were interested in the old Greek manuscripts and in the wonderful old Greek art. The knowledge of these writings and of this art had been shut up so long in the East that when the study of them was revived it was called the New Learning and the New Birth of Art—or the Renaissance, as we say. Many scholars from all over Europe journeyed to Italy in those days, and returned to their own countries to fire others with enthusiasm for the study of Greek and its wonderful literature. "I have given my whole soul to Greek learning," wrote Erasmus, the friend of More and Colet, "and as soon as I get any money I shall buy Greek books: and then I shall buy some clothes."

THE MIGHTY EMPIRE OF THE CRESCENT THAT STRETCHED ACROSS EUROPE

During the years that followed the taking of Constantinople the Crescent on the Ottoman banner shone triumphantly over an immense and powerful empire from the Danube to the Euphrates, from the Caspian Sea to the Straits of Gibraltar. The discipline and unity of purpose of the Mohammedans prevailed against the jealousies and quarrels of the Christian kingdoms. Deeds of daring and heroic resistance were not wanting, and there were terrible revolts and massacres; but so bitter were the jealousies between Christian rulers, so intense the rivalry between the East and West branches of the Church, that not only was there no united front against the followers of Mohammed, but on several occasions

Christians sought alliance with them against their fellow Christians.

Among the Turkish rulers—who came to be called sultans—were many strong and clever men. One of the greatest was Mohammed II, who had ridden over Constantine's body and up the nave of St. Sophia on that eventful day in May, 1453. He ruled for thirty years, and conquered Serbia, Bosnia and Greece.

Suleiman the Magnificent lived at the same time as Henry VIII of England. An old German song shows the terror which this "Grand Turk" cast over the Holy Roman Empire. It says: "The furious Turk has lately brought great forces into Hungary; from Hungary he has quickly entered Austria in the light of day; Bavaria is his for the taking; thence he presses onward and may soon come to the Rhine, for which cause we have no peace or rest."

A LONG LINE OF WEAK AND CRUEL RULERS OF THE CONQUERING TURKS

It was said of Suleiman that while he ruled, sword and pen were never dry, so continually was he fighting, and so great was the number of writers in his day. It was he who swore he would take no rest till the prayer of the Prophet rang out from the tower of St. Stephen's Church in Vienna. But his quarter of a million Turks were obliged to retire from the gallant city, and so the spread of the Turkish power in the valley of the Danube was checked for a while.

A few years after Suleiman's death, at the great naval battle of Lepanto, a limit was set to Turkish power in the Mediterranean also, and on the sea generally. After this came a succession of weak and cruel rulers, and under them there were wars with the Persians, mutinies of the Janissaries (who had become a very rich and strong body), and other disasters. Ottoman power rose again for a time under the able rule of a family named Kiuprili, many of whom acted as prime ministers, or chief viziers. It was under one of these men that the Turks determined to try their fortune again at Vienna. Enormous preparations were made, and alliances were renewed with most of the surrounding nations, so that the emperor should be left without help.

The vast hosts advanced, spreading terror and desolation in their way. Then they encamped before Vienna. The peasants had crowded into the city

THE DOWNFALL OF CONSTANTINOPLE



Few cities have been besieged and taken so many times as Constantinople. Since the middle of the sixth century it has undergone twenty-six sieges and has been captured eight times. But its most terrible experience was in 1204, when it was taken by the Crusaders. The city was given up to pillage; and the so-called Christian warriors acted more barbarously than any Turkish invaders have ever done.



The capture of Constantinople by the Turks in 1453 was another terrible experience for the ill-fated city, and about 60,000 men, women and children were made slaves, and dispersed through the Turkish Empire. But the fall of Constantinople had a greater meaning than its military one—the triumph of Crescent over Cross; it had more far-reaching effects than any other event in modern history, for by driving scholars into Italy from the East it helped the great revival of learning, and this led to the Reformation.

from the country round. There was but a small garrison, the old walls were out of repair, and the Turks, the best engineers and artillerymen in Europe, soon undermined them and drove off the emperor's soldiers.

HOW THE POLES ARRIVED IN TIME TO SAVE VIENNA

At last, after two terrible months, when it seemed only a question of days before the Turkish general would gain the glory of receiving the submission of the devoted city, a troop of Poles was seen hastening down the vine-clad slopes, shouting at the top of their voices, "Sobieski forever!"

The terror of the name of John Sobieski, the gallant king of Poland, who had inflicted such terrible defeats on them before, filled the Turks with panic, and they fled on all sides, leaving immense treasure behind them. The siege was raised, and the Turks were driven out.

At this time the Turks were masters of the whole of the Balkan peninsula; but from that September day in 1683, thanks to John Sobieski and his gallant Poles, the tide of Turkish power in Europe began to ebb. No more did the sultans threaten and terrify the whole of the Christian world, although they continued to have some success and for many years kept in bondage and misery all the nations of the Balkan peninsula.

The Turks were driven out of Hungary; many towns and islands in the Mediterranean were taken from them; Greece passed for a time to the Venetians before entering on its long, final struggle for freedom against the Turks. The Russians, now growing into a power in Europe, captured Azov, on the Black Sea, and by degrees its northern shore passed into their hands. Ships on the Black Sea meant power to threaten Constantinople.

THE STRUGGLE OF THE SMALL NATIONS AGAINST THE TURKISH POWER

With the growth of Russia's power came the right to interfere in the provinces north of the Danube, particularly Moldavia and Wallachia, which were dependent on Turkey. This country's frontier fell back to the river Dniester, then to the Pruth, and for many years Moldavia and Wallachia were alternately under Russia and Turkey.

The growth of Russia had a great effect in restoring to power the Greek Church.

As the church of a chief power in Europe it bound that power in close sympathy with its poorer brethren of the smaller and despised nationalities, and gave many chances of encouraging their revolts.

The Western nations, in love with liberty, also gave their sympathies to the oppressed Balkan peoples, and often gave help that was better than sympathy. The story of the two hundred years before 1918 was a story of the striving of nation after nation to gain freedom from its Mohammedan rulers.

At the beginning of that period Turkey held all the Balkan peninsula, Hungary to the summits of the Carpathians, all that is now Rumania, part of the Russian Ukraine, the Crimea, the northern slopes of the Caucasian range, part of Georgia, all Asia Minor, nearly all of Armenia, part of Kurdistan, Mesopotamia, Palestine, Arabia, Egypt, Tripoli, Tunis and Algiers, with Albania, Bosnia, Herzegovina, Dalmatia and part of Croatia.

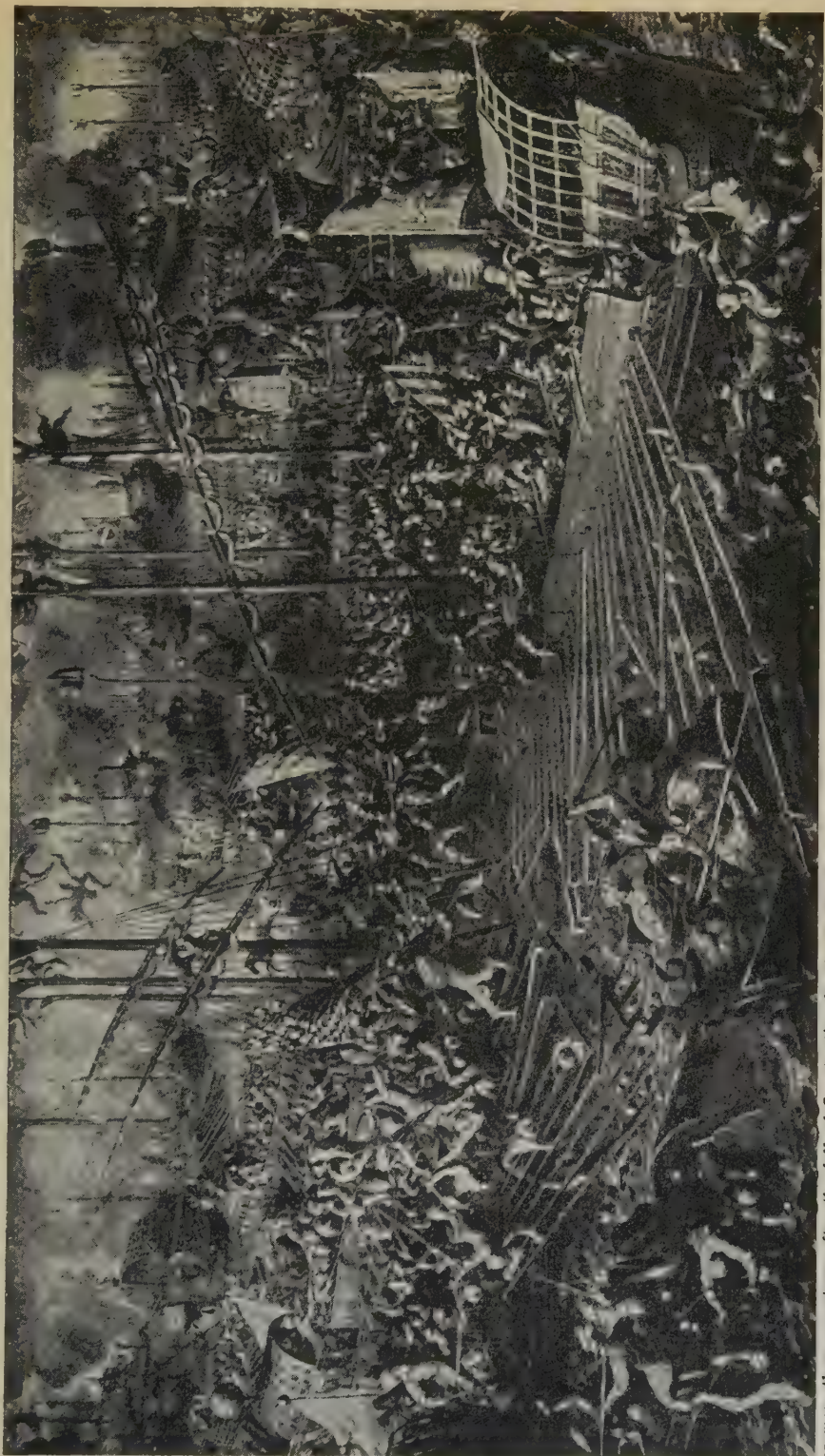
HOW THE WORLD WAR BROKE THE POWER OF TURKEY IN EUROPE

Two hundred years later, at the end of the World War, she had lost Algiers and Tunis to France; Rumania, Serbia, Greece and Bulgaria were independent; Egypt was only under a sovereignty that had no meaning; Bosnia and Herzegovina had passed to Austria, and only Macedonia and Thrace in Europe, and Asiatic Turkey, with Palestine and Mesopotamia, remained Turkish; while Russia had annexed a part of Armenia and all lands once Turkish in the Circassian district.

All these losses were regarded by the world at large with thanksgiving, for it had become clear that as a governing race the Turks were impossible. They had plenty of bravery available for the defense of their possessions, but no judgment or energy, tolerance or business tact to help them to govern. Their contempt for the people outside the Mohammedan faith made any part of their dominion liable to be drenched with the blood of massacres.

The same story of massacre was repeated whenever there was a sign of restlessness—in Bulgaria, in Armenia, anywhere that a thinning of unfriendly people seemed desirable. No intervention by foreign governments made any difference, for the Turk would make the fairest of promises and then act directly contrary to them wherever religious big-

THE BATTLE OF LEPANTO, WHERE TURKEY LOST HER SEA-POWER



For more than a century after the fall of Constantinople, the Turkish navy was thought to be invincible. But at the battle of Lepanto, in 1571, Don John of Austria, a son of the emperor Charles V, routed the Turkish fleet, Turkey lost control of the sea, and her victorious progress in the West was stopped. The Turkish fleet consisted of 277 ships and 120,000 men. The Christian forces were made up of the fleets of Venice, Spain, the Pope and the Knights of Malta, but it was Don John's skill that won the day.

otry or national feeling became involved. Each country that escaped from his sovereignty did so with tumultuous rejoicing.

When Germany's ambition turned the Kaiser's thoughts to the East he saw in Turkey a possible helper, and the officers of the Turkish army who had studied the arts of war in Germany were impressed by the military power of that nation, which appeared to them irresistible. Accordingly, when the World War broke out,

the Mesopotamian plain; an advance from Egypt on Palestine; and an attempt to reach Constantinople from the Mediterranean through the Dardanelles and over the Gallipoli peninsula.

The Mesopotamia advance was finally successful. The British Gallipoli attack was repulsed after heroic bravery had been shown and terrible losses suffered on both sides; and the blow through Palestine, under the dashing leadership of General Allenby in 1918, succeeded so



CONSTANTINOPLE WITH THE MOSQUE OF SULEIMAN, FROM ACROSS THE GOLDEN HORN

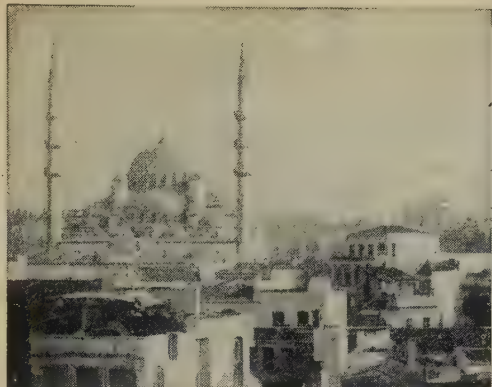
these men linked Turkey with the fate of Germany. There never was any reason for supposing that they represented the real opinion of the Turkish court, or of the average Turk, who had long regarded the British as friendly advisers; but the Prussianized Turkish officers controlled the army, and Turkey became Germany's ally in the Near East.

But the help given by Turkey to Germany was only indirect, for after a Turkish attack on Egypt, Great Britain struck at her along three lines of advance, and all Turkey's strength was needed to ward off a British movement from India by the Persian Gulf, on Bagdad, the capital of

completely that Turkey followed Bulgaria in unconditionally surrendering.

The territorial losses to Turkey through her support of Germany were Mesopotamia, which was formed into an independent Arab kingdom known as Iraq, with Feisal as king, but temporarily under the friendly guardianship of Great Britain; the Arab kingdom of the Hedjaz, in Arabia; the Emirship of Transjordan under Abdullah, brother of Feisal and son of Hussein, king of the Hedjaz; Palestine, administered by Great Britain under a mandate from the League of Nations; Syria and Lebanon, administered by France under a mandate; and

TYPES OF BEAUTIFUL TURKISH MOSQUES



The Mosque of Sultan Valideh.



The Mosque of Sultan Ahmed.



The gorgeous Mosque of Mohammed the Conqueror, in Constantinople.



The Mosque of Suleiman.



The Mosque of Sultan Bayazid II.

the part of Thrace west of the Maritza River ceded to Greece.

The losses were considerably greater at first, for in Asia Minor, Smyrna and the district around were given to Greece, and that country, with an ambition beyond her strength, advanced eastward till Greece occupied Asia Minor beyond the highland borders of Anatolia. This vigorously aroused the patriotism of the Turks, and, advancing from their Anatolian capital of Angora (for Constantinople was occupied by British, French and Italian forces), they completely routed the Greeks in September, 1922, and swept them out of Asia Minor.

TURKEY AS A REPUBLIC BEGINS TO FOLLOW EUROPEAN WAYS

The peace which followed this rout of the Greeks found the Allies disunited, and so gave Turkey Constantinople, and re-established the Turks in Eastern Thrace with renewed possession of Adrianople. The Sultan was dethroned, and retired from Turkey; and a Republic was established with Mustapha Kemal Pasha as President, and Angora as its capital.

The government of the new Turkey is based on a democratic constitution, with a single House of Assembly to which national affairs will be submitted, and the aim is to bring Turkey into line with modern life and its improvements.

Evidences that support this programme are the greater freedom given to women, and proposals for the abolition of polygamy—the marrying of many wives by one man. Many educated Turkish women are going about unveiled, and the wearing of European garments is being allowed to women who know Western life.

The revived and consolidated Turkey, beginning a new life, consists, first, of Eastern Thrace in Europe, with the great historical cities of Constantinople and Adrianople as its populous centres. Constantinople has been one of the great cities of the world for nearly sixteen hundred years. It has a population of more than a million, and no city on the earth has a greater variety of races.

CONSTANTINOPLE—THE ANCIENT GATE BETWEEN EAST AND WEST

Constantinople's position as a link between the eastern and western parts of the Old World of history, and its command of the passage between the Black Sea and the Mediterranean, will always give it high importance. Adrianople,

with a population of 80,000, the centre of a very fertile district, was more important in the days when Turkey governed the Balkan peninsula.

The river Maritza is the boundary of Turkey in Europe westward, and the Bulgarian frontier is the northward boundary. Midia is the Black Sea port for the Adrianople district. Both in Thrace and in Asia Minor the Turks have expelled the Greek population, and apparently have a plan of reserving Turkey for the Turks, though the Western trading nations are welcomed.

The Turkish Republic in Asia Minor is a solid block of country chiefly mountainous, and the natural home of the Turkish race. The only part of the frontier in dispute is where Kurdistan joins Mesopotamia to the northeast of Mosul. The Mosul district, which is rich in oil, was held jointly by the British and Arab governments. The Turks claimed it through the Kurds who inhabited the neighboring hills. Failing settlement, the League of Nations sent a commission into the country to decide.

THE NATURAL WEALTH OF TURKEY THAT IS WAITING TO BE DEVELOPED

Turkey is an agricultural country. Its chief exports are dried fruits (particularly raisins), carpets (its one considerable manufacture), and tobacco and wool. It has valuable unworked minerals, including copper, silver and lead. Petroleum is found here and there. Cotton, coffee and opium are produced chiefly for home consumption. The Turks themselves are not a business people, but are for the most part quiet agriculturists.

The chief towns are: Smyrna, which had a population of 200,000 before the war; Broussa, the capital before the Turks entered Europe; Scutari, opposite Constantinople; Sivas; Kaisarieh, and Konia. Trebizond is the chief port on the Black Sea.

Under the stress of the world's disfavor, because of their harsh treatment of subject races, this warlike people have roused themselves and have shown that they have not lost the qualities which once made them conquerors. As they are now gathered within the lands that are rightly theirs, the good wishes of other nations will follow if they show in their peaceful development the manly spirit that is theirs in war.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 4917.

IN HISTORICAL CONSTANTINOPLE

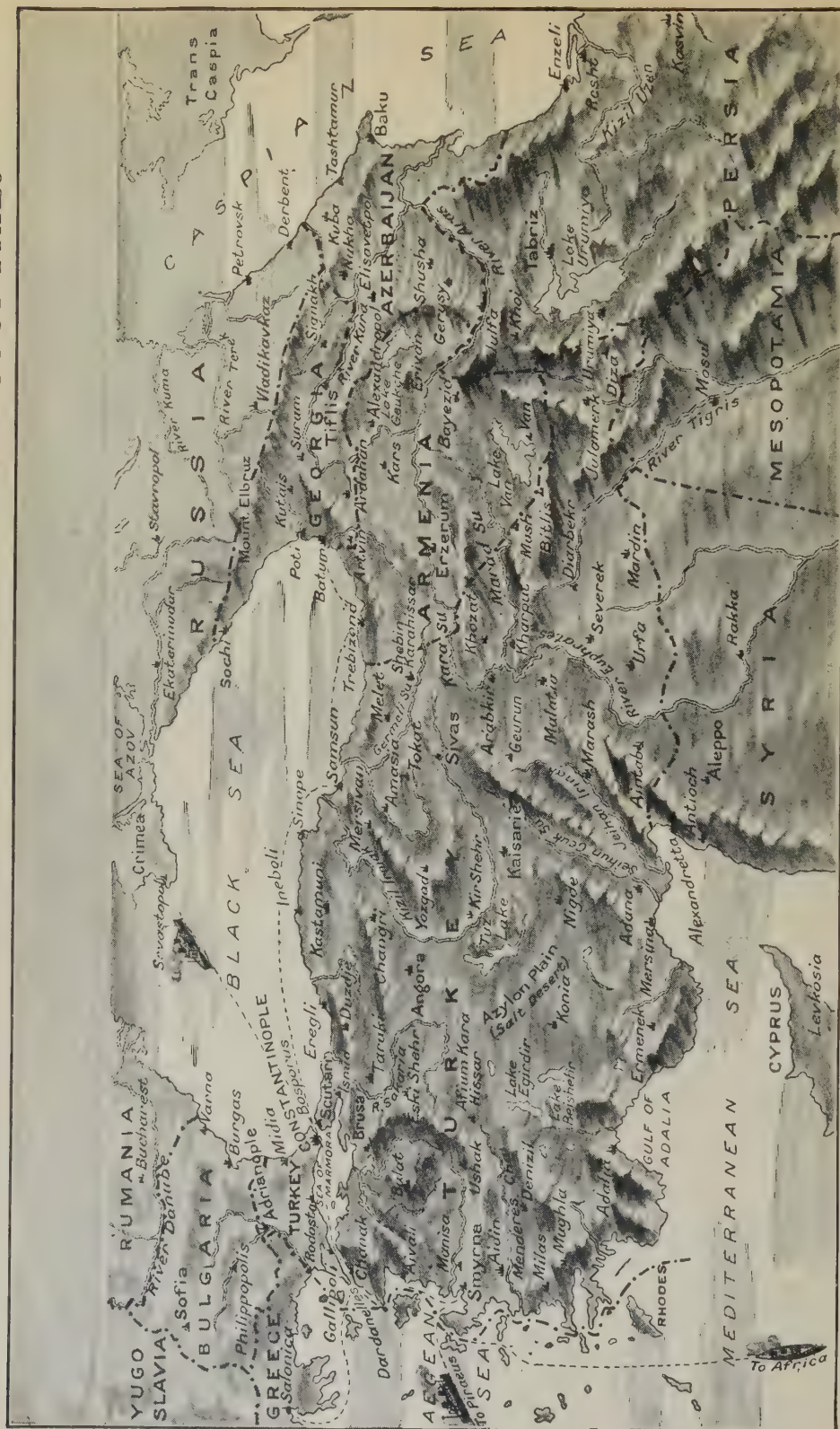


The mosques of Constantinople are all copies more or less of St. Sophia, which we see in this picture. They have courts in front with a range of arcades round, and the centre portion forms the prayer chamber. The term "mosque" comes from an Arabic word meaning "to adore." The chief feature in a mosque is the niche, or mihrab, which is sunk in a wall at right angles to a line drawn from Mecca.



This is the busy Galata bridge in Constantinople. For some distance outside the Galata bridge (to the left in the picture) both shores of the Golden Horn have been provided with a quay at which large steamers can moor to discharge or embark their passengers and cargo. This was completed in 1889.

TURKEY AND THREE OF ITS NEIGHBORING COUNTRIES



This map of Turkey, with the new independent countries of Georgia, Armenia and Azerbaijan, shows their mountains, rivers and cities.

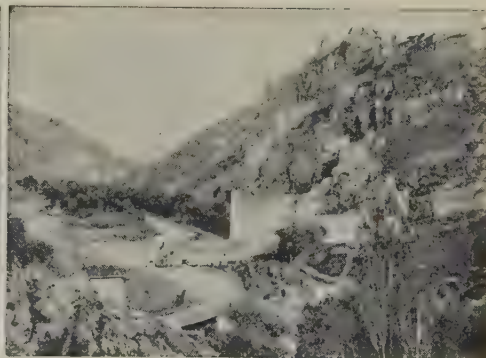
ANGORA, CAPITAL OF THE REPUBLIC OF TURKEY



A Seljuk mosque in Asia Minor.



A new road into Angora.



The old walls of Angora.



The stone houses of Angora.



The National Museum in Constantinople.

Photos, Exclusive News Agency and others.

TURKISH CITIES OF ASIA MINOR



The pottery market in Broussa.



The harbor of Smyrna.



The ancient aqueducts of Paradise in Smyrna.



A camel caravan, Smyrna.



Broussa, in the shadow of Mount Olympus.



Photo, courtesy Paramount Pictures.

Moses, the great lawgiver.

THE LAW—THE POWER SUPREME

ALL of us should obey the law. The word Law comes from an old Anglo-Saxon word meaning "that which is fixed." We use it sometimes to describe those forces of nature from which we cannot escape, but which we may learn in time to use intelligently.

The law we are here concerned with is a body of rules imposed by the will of the nation on every person in the nation. Unlike natural law, it is changeable, and does actually change as men grow more enlightened. The laws of men are made to fit the times men live in.

Thus the law says that we must do certain things, as, for example, to register the death of a person with the proper official, or to pay a tax to help to defray public expenses. The law also says we must *not* do certain things, as, for example, to steal the property of another, or to employ a child to work in a coal-mine.

But the law not only deals with things which must be done and things which must not be done: it concerns itself with the business and social relations of the people. For example, it protects contracts or agreements made between citizens, and provides



a remedy when an agreement is broken; it awards compensation when a workman is killed or injured while at work.

Our laws are partly written and partly unwritten. Written law is Statute Law, or, in other words, it consists of the acts of the lawmaking bodies. A good deal of English law, which the first colonists brought across the seas with them, rests on custom, or what has been done before, and is called Common Law. When a matter is settled under common law it is said to rest on precedent; that is to say, on what has *gone before*. Common law is very largely the carrying on of custom by general agreement. Many parts of the common law, indeed, are rooted in the customs of the old Anglo-Saxons. Customs became laws based on precedent.

An enormous mass of doctrine has often to be considered in the decision of a legal point. One lawyer will argue before the judge that the case is similar to that of *Jones versus Brown* (*Jones against Brown*), heard in 1846, as modified by the case of *Black versus White*, heard in 1902; his opponent will reply that the true precedent is the case of *Towler versus Tyerman*, heard

in 1862, as modified by the further decision of the judges in *Derry versus Ray* in 1885. It is a complicated thing, the common law, and it is preserved by respect for precedent. It is a body of doctrine administered by judges who follow faithfully in each other's footsteps in preserving the principles laid down in olden times. Even with regard to statute law, the written law, the judges find much to do in filling in the framework of an act.

HOW A JUDGE'S DECISION MAY CHANGE THE IDEA OF THE LAW

Words may be used which have not been closely thought out, or are badly expressed, or are capable of different interpretations. In such cases the judge decides what the act means, and each decision of a judge becomes a precedent guiding other judges as to the meaning of the act. Sometimes in this way a judge's decision so changes the real purpose in making the law that a new law has to be passed to make the original act effective. The very greatest care is obviously necessary in drawing up a bill which is to become the law of the land.

It has been increasingly recognized that the unwritten common law has many inconveniences, and from time to time parts of it have been written down, or *codified*, to make things simpler and plainer. Until quite recent years the law relating to the buying and selling of goods was largely unwritten. Some people think all law should be summarized in a written code, as was done by the Romans long ago, and for the French in the famous Code Napoléon, which has been copied in other countries.

THE LAWS OF ROME THAT WERE SET UP FOR ALL TO SEE

In the early days of Rome the Senate made the famous Code of Laws known as the Twelve Tables, which were engraved and set up in the Forum. This was a written code of justice based largely on existing customs and legislation. The Romans were great lawgivers, and not the least part of their work for civilization was the respect for law which they created. A thousand years after the Twelve Tables the emperor Justinian appointed ten learned lawyers to write a new code, to simplify the mass of laws and customs which had grown up and become unwieldy and obscure. In the year 529 the first edition of the Justinian

Code was completed. It was revised and improved in 534, and was a powerful aid to civilization. It contained much that we could hardly approve to-day, but, as a great lawyer has written, it has exercised the most beneficent influence on moral and political science, and has introduced "more just and liberal ideas concerning the nature of civil government, and the administration of justice, in all the nations of modern Europe, which rose on the ruins of the Roman Empire."

Even when the barbarians overthrew Rome they found themselves constrained to respect Roman law. The word justice is a Roman word, and it is not too much to say that Rome gave law to the Western World. No finer words on the subject of law have ever been written than the definition of justice by Ulpian, the great Roman lawyer, over seventeen hundred years ago, when he defined justice as "the constant and perpetual wish to render everyone his due."

HOW THE COMMON LAW HAS IMPROVED WITH TIME

The common law, then, is a growth which began with our Anglo-Saxon ancestors, which rests largely on precedent and has been partly embodied in written acts. Much of its old severity has been shorn away, partly through changes effected by the modifying decisions of judges and partly by statute. As an example we may notice that under the old common law a debtor could be thrown into prison and kept there till his debt was paid—a cruel and stupid law which was not abolished until the last century.

During the Middle Ages the imperfection and inequality of the common law in its application to the practical affairs of life led to the formation of the Courts of Chancery, and a Court of Equity grew up—equity meaning "equality" or "fairness." The King, appealed to by sufferers under the common law, would refer them to his Lord Chancellor. Thus the petitioners for justice came to be heard in the Chancellor's Court, which came to be called the Court of Chancery. This court, striving to do justice outside the rules of common law, gradually established rules of equity. The common-law judges long looked with hostility on the Court of Chancery, and unfortunate suitors were sometimes sent backward and forward between common law and equity, until justice became a mockery.

THE DIFFERENCE BETWEEN CIVIL AND CRIMINAL LAW

There are several divisions of the law, but the two of which you hear most are the Civil Law and the Criminal Law. The first regulates the rights of persons and property, and the second has to do with crime and punishment. Let us see what this means.

The law-making body declares that certain acts are against the welfare of the whole people. By this act they become crimes. Some are not very serious, and the punishment may be only a small fine, or, if the offense is a little more serious, a fine and imprisonment for a short period. For more serious crimes, as burglary or killing a man, the punishment is very much heavier. In the criminal court a representative of the State presents the charge and calls witnesses and asks for conviction and punishment. The accused has the right to be heard in his own defense and to call witnesses in his favor. He has also the right to be represented by a professional lawyer.

On the other hand, suppose two men cannot agree about the correct boundary between their land, or suppose one has been injured by a machine or an animal belonging to another. The people as a whole have not been injured. No crime has been committed. The dispute is between citizens, and is therefore called a civil case. The State takes no part except to set up a court which will decide what is the correct boundary, or whether the owner of the machine or animal ought to pay damages to the other, and how much. When the matter has been decided, the State steps in and requires that the decision be respected.

But how are such cases decided? First judges, or justices, as they are sometimes called, are selected who decide what is the law in the matter. These justices are not all of the same rank. Some have the right to deal with unimportant cases only. Others deal with more important cases, or with those which have been appealed from the lower courts. These justices should be of high character and possess sound knowledge of the law.

THE WAY IN WHICH TRIAL BY JURY WOULD PROBABLY BEGIN

In trying criminal cases, and in many civil cases, the judges are aided by an ancient institution called the Jury. The jury consists of a body of men and

women, usually twelve, who are chosen and sworn to make a truthful decision upon the facts of the matter put before them.

The jury system is exceedingly important, yet no one seems to know exactly how it arose, though it appears to have had its origin in customs introduced into England by the Normans. All important criminal trials are jury cases, and juries are also impaneled in many civil cases. Coroners, too, usually make their inquiry with the help of a jury.

The verdict of a jury in criminal cases must be unanimous. This not infrequently leads to failure to arrive at a verdict at all, and a fresh trial before a new jury must take place. This custom seems to have originated in the old idea that before a citizen could be condemned as guilty "twelve good men and true must be agreed that he is guilty."

THE INFLUENCE OF THE JUDGE ON THE VERDICT OF THE JURY

It is the jury which decides questions of fact, but in practice the judge has much to do with the verdict. The judge decides what evidence is admissible, and the last words spoken to the jury are in his summing-up of the evidence. The manner and matter of the judge's utterance, therefore, necessarily weigh very heavily with the jurors.

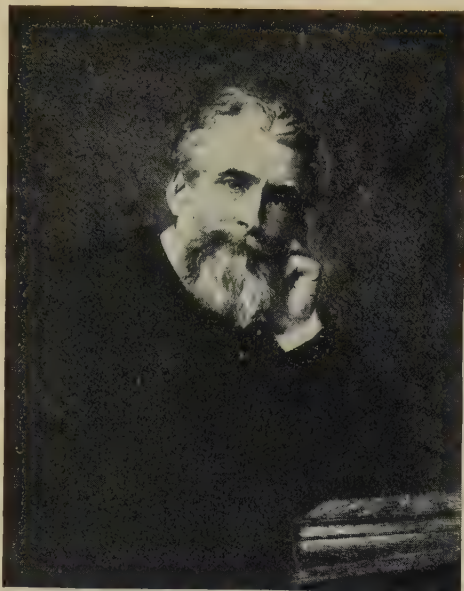
The greatest uncertainty often attaches to the issue of a trial in the courts, for it is uncertain what the verdict of a jury may be. Wise lawyers, therefore, often advise their clients never to take a case into court if it can be avoided.

We should not make the mistake of considering the law merely as bearing on disputes between private persons. Such disputes are inevitable, and the processes of law often have to be used to settle them. The main part of the law, however, is concerned with making rules which govern the citizen in his relations with his fellow-citizens.

It is not actually necessary in "going to law" to engage someone to represent you in court, and now and then we see a citizen conducting his own case. But it is a risky experiment, because of the great difficulty and complication of the subject. Very poor people have the privilege of taking proceedings into the courts without paying fees, and with voluntary legal help.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 4913.

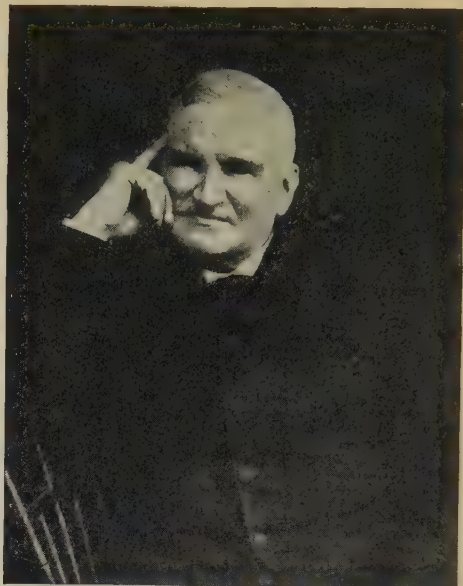
CHRONICLERS OF NATIONS



From the etching by W. H. M. Bicknell.

JOHN LOTHROP MOTLEY

The historian Motley was seized with the desire to write "one particular history"—that of the Dutch. After obtaining all available material in America he went to Holland in 1851, and five years later published *The Rise of the Dutch Republic*.



Photo, Benjamin Kimball.

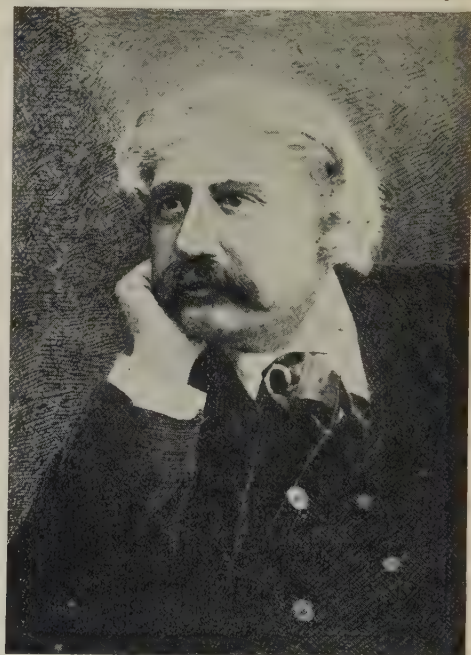
FRANCIS PARKMAN

The seventy years of Francis Parkman (1825-93) were almost all devoted to the main purpose of his life, namely the writing of the story of the rise, fall and decline of the French power in North America. His health handicapped him seriously.



JOEL CHANDLER HARRIS

Joel Chandler Harris was born in Georgia in 1848 and died at the state capital in 1908. He began work as a printer's apprentice and advanced to editorial work. (Reprinted by permission of The Bookman from the issue of August, 1908.)



FRANCIS BRET HARTE

Bret Harte was thirty-one years old when his poem *The Heathen Chinee* first made him famous. He had done already much spade work in the literary field as journalist, poet and editor. After 1885 he lived near London.

Photo, London Stereoscopic Co.



Photo, Ewing Galloway.

House at Hartford, Connecticut, long the home of Mark Twain.

AMERICAN LITERATURE, 1865-1900

WHEN the Civil War ended, the poets of whom we spoke in the last story were still writing, but most of their best poems had been written before the war. Lowell, who, like Irving, was made minister to Madrid and afterward minister to London, turned to essay-writing and gave us the essays on literature and politics for which he is famous. During the war Edward Everett Hale, a Unitarian clergyman, wrote *A Man without a Country*, a thrilling story that every child should read. He wrote many other books during his long and busy life. Edmund Clarence Stedman, who had been a newspaper correspondent during the war, became a broker in New York, but found time to write critical essays and poems that helped to make the great city a centre for literature; and Thomas Bailey Aldrich, who was born in 1836 and lived until 1907, became well known for his beautiful little poems and his humorous stories. In *The Story of a Bad Boy* he wrote about his own early life in Portsmouth, New Hampshire, where he was born. This is the most interesting of his books for young people.

Most of our attention so far has been given to Northern writers. About the time of the Civil War two



Southerners, Paul Hamilton Hayne, who was born in 1830, and Henry

Timrod, who was born in 1829, brought Charleston, South Carolina, into prominence as a literary centre of the South. In

1861 Timrod wrote his *Cotton Boll*, probably his best poem, but he died in 1867. Hayne lived until 1886, but *The Battle of Charleston Harbor*, which he wrote in 1864, stands above all his other poems.

After the war, however, two other poets—John Banister Tabb, a Virginian, and Sidney Lanier, of Macon, Georgia, began to sing in the South. Tabb, who was born in 1845, and Lanier, who was born in 1842, were both captured on blockade-runners, and the two boys met in prison and became lifelong friends. The war destroyed all the Tabb family property, and John Banister taught in a boys' school in Maryland. He was ordained a priest in 1884, but continued to teach until his death, in 1906. His poems are all short. They are so simple that a child can understand and enjoy them. So beautifully are they written that they have been compared to fine cameos. You will find some of them in the *Book of Poetry*.

Sidney Lanier came out of the war with his constitution ruined by prison

life, and tramped back to Georgia with his beloved flute for company. The rest of his life was a struggle with poverty and ill health. Above all things he loved music and poetry, but to please his father he became a lawyer. Afterward he played in an orchestra and lectured on English literature. Still, when he died, in 1881, he had written a number of charming musical poems, such as *The Song of the Chattahoochee*, *The Marshes of Glynn*, *The Ballad of Trees*, and *The*

just as they had been told to him. After they were published he found, to his surprise, that educated people were not only enjoying his books but were using them to learn something about the negro people in Africa. Mr. Harris wrote other books, but none was so successful as the *Uncle Remus* stories. He died in 1908.

MEN WHO WROTE FUNNY BOOKS AND MADE PEOPLE LAUGH

Humorous books were very popular before the Civil War, and had begun to



Photo, courtesy Southern Railway System.

Home of Joel Chandler Harris at Atlanta, Georgia.

Master, and others which were collected into a volume.

UNCLE REMUS' FAMOUS STORIES OF ANIMALS

Boys and girls, men and women, all enjoy the stories of *Uncle Remus*, in which animals talk and act as if they were human. They were written by Joel Chandler Harris. Born in Georgia in 1848, in his boyhood he made friends with the negroes as he roamed about the country and learned the customs and traditions that the slaves had brought from their far-off home in Africa. Years later, when he was editor of *The Atlanta Constitution*, he remembered these old stories, and, to the great delight of children, he wrote them down

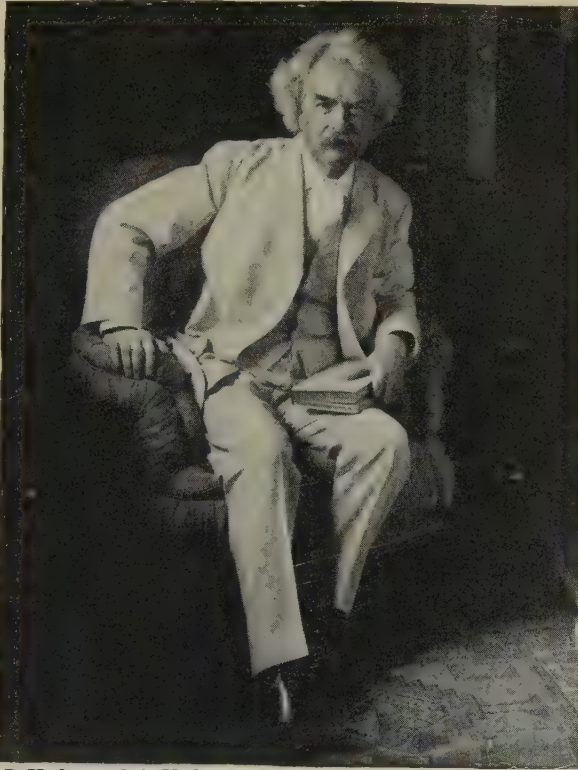
take an important place in the nation's literature. After the war people liked them even better, for they made them laugh and forget the sadness which the war had brought. Many of these humorous books have been forgotten, but a few of the writers deserve to be remembered.

Benjamin Shillaber (1814-90) created the famous "*Mrs. Partington*." David Ross Locke (1833-88) pretended to be the Reverend Petroleum V. Nasby, and wrote a series of letters in which the weaknesses of the Copperheads, as the Peace Democrats were called, were held up to ridicule. Josh Billings was the name used by Henry Wheeler Shaw (1818-85), a native of Maine. He wandered to the West in his youth, but

after a time went to live in Poughkeepsie, New York, where he became an auctioneer and wrote quaint, whimsical sketches full of practical philosophy. Artemus Ward, who in real life was Charles Farrar Browne (1834-67), was humorously merciless to insincerity of every kind. He died at Southampton in 1867 on his way home from a lecture tour in England, where he was very popular.

These writers made their fun still more amusing by misspelling words. Other

humorists wrote in dialect. For instance, Marietta Holley made good-humored fun of social customs and politics as seen through the eyes of Josiah Allen's Wife, a shrewd, homely country woman from the northern part of New York State. At the close of the century, about the time of the Spanish-American War, and after it, Finley Peter Dunne, in Mr. Dooley in Peace and War and half a dozen other books, set the whole country laughing over the humorous



© Underwood & Underwood.

Mark Twain.

conversations between his creations "Mr Dooley" and his friend "Mr. Hennessey," with their racy opinions on the war, the fear of the Spanish fleet and the national pride in the victories won by the army and navy, and his funny comments on politics in later years.

MARK TWAIN, THE GREATEST OF AMERICAN HUMORISTS

Greatest of all the humorists was Mark Twain, whose real name was Samuel Langhorne Clemens. He was born in 1835 in Florida, Missouri, but the family soon moved to Hannibal, Missouri. His

father died in 1847, and as he left little money, it was necessary for the twelve-year-old Samuel to leave school and go to work. He and his mother decided that he should learn printing, because a printer's work was educational, and so he went into the office of The Hannibal Journal. Six years later he set out on his travels, and for three years worked his way in New York, Philadelphia, St. Louis, Cincinnati, and Keokuk, Iowa. Then he suddenly decided to be a pilot on the

Mississippi, and he became a very good one. The Civil War ended his work on the river. The next five years of his life were rich in varied experiences. He galloped across the continent on the overland mail, reported for newspapers in Carson City and Virginia City, Nevada, prospected for gold, and wrote for newspapers in San Francisco. Meanwhile he was gaining that knowledge of human nature which makes his books so absorbing.

His first sketch, The

Jumping Frog of Calaveras County, was published in 1867 under the name of "Mark Twain." That pen name was taken from the call of the Mississippi leadsmen to the pilot, and means "the boat has two fathoms, or twelve feet, of water under her and a safe channel." In Innocents Abroad, a book over which thousands of people have laughed, Mark Twain makes famous the tour which he took in 1867 to the Mediterranean countries and the Holy Land. In Roughing It he turned to good account his journey across the plains and his life in the West. In 1876

he published *Tom Sawyer*, in which he wrote of the life of a boy in a Mississippi town at the time of his own boyhood. In 1884, in *The Adventures of Huckleberry Finn*, he pictured with masterly skill the lives of the people who lived along the banks of the Mississippi, the vast river itself, and the rough men who worked the boats up and down its navigable length, just as they might have been seen by Huck Finn, who was a real boy. *The Prince and the Pauper*, a historical tale for children, makes little King Edward VI of England change places with Tom Canty, a ragged boy of the London streets, and so learn something of the unhappy lot of the poor people in his kingdom. In 1896 came *Joan of Arc*, the tenderest, most beautiful story of the life of the great French heroine that has ever been written. It is quite unlike his other books, but many of his readers think, with the author, that it is his best. There seems to be general agreement, however, that *Tom Sawyer* and *Huckleberry Finn* are Mark Twain's masterpieces. Certainly they are two of the best boys' books that have ever been written.

Samuel Clemens made a great deal of money by his books and humorous lectures, but he also spent a great deal. He lost so much in 'unwise business ventures that in 1895 he was threatened with bankruptcy. He was then sixty years old; but to avoid the disgrace of being unable to pay his debts he set out on a lecture tour of the world to make another fortune, and was so honored that the tour was singularly successful. It was after this that he wrote *Joan of Arc*, and, in fact, he continued to write books until almost the end of his life, which came in 1910.

ANOTHER PRINTER WHO BECAME A FAMOUS WRITER

Like his friend Mark Twain, William Dean Howells began life as a printer. He was born in a little Ohio village in 1837 and soon learned all he could in the village school. While he was only a boy his father, a country editor, took him into his office to learn the printing trade. But the boy wanted to be a poet, and studied Chaucer, Shakespeare, Pope, Tennyson and Lowell, and in prose took Macaulay as his model.

In 1861 he was appointed United States consul at Venice, and in his book called

Italian Journeys gave a delightful account of his wanderings through Italy during the four years that he lived there. He came back to America in 1865, and was for some years editor of *The Atlantic Monthly*. Later he was connected with *Harper's Magazine*; but he spent most of his time writing short plays, novels, essays, books of travel, and his impressions of the great writers he had known. They are meant for grown people, but children like his *Italian Journeys*; a *Boy's Town*, in which he described the place of his birth; and *Silas Lapham*, a book that many people think is the best novel that has been written in America. Howells lived until 1920. It seems strange that a man who wrote books within our own lifetime was the friend of Emerson, Longfellow, Lowell and other famous men who seem to belong far back in the past.

BRET HARTE, WHO WROTE SHORT STORIES OF THE WEST

None of the early American writers thought of using the manners and customs of the places in which their story people lived as part of the story itself in order to increase the interest. But about 1870 Francis Bret Harte, a young magazine editor, seeing that some of the dramatic, and often pathetic, incidents in the life of the western mining-camps could be made the foundation for short stories, used such an incident in *The Luck of Roaring Camp*, a story touched with humor and pathos.

Bret Harte was born in 1839 in Albany, New York, and inherited his love of study from his scholarly father. When he was about fifteen he went to the West and became a typesetter. Later he was made the editor of a magazine in San Francisco, in which *The Luck of Roaring Camp* was published. Though he wrote many other stories, chiefly of the West, this is his best and is one of the finest short stories ever written. It brought him from a Boston publishing house an offer of a position paying a large salary, which he accepted.

In 1880 he was made consul at Glasgow, Scotland, and in 1885 went to London, where he lived and wrote until his death, in 1902.

STORIES TO WHICH THEIR WRITERS GAVE A HOME

For a while after Bret Harte became famous other writers followed his example and wrote stories that could have

happened in only one town or country place, or about people who lived all their lives in one locality. Sarah Orne Jewett, who lived from 1849 to 1909, wrote about the people of Maine. In her girlhood as she drove about with her father, a busy doctor, on his visits, she studied the retired sea captains, old ladies and children of whom she afterward wrote lovingly, using as her setting the old sea towns in which her characters lived. *Deephaven* was her first book. *A Native of Winby* and *The White Heron* are her best. You will probably like *The White Heron*.

Charles Egbert Craddock, who in real life was Mary Noailles Murfree, of Murfreesboro, wrote stories about the simple lives of the mountaineers of Tennessee. She was lame, as the result of an accident, and was not able to climb about much with the other children during their summers in the mountains, but she observed the people and their ways, and at an early age began to write about them and created great sympathy for them.

George W. Cable, who was born in New Orleans in 1844, wrote fascinating stories about the Creoles, as the people of French and Spanish descent are called in Louisiana. The first of these stories, *Creole Days*, was published in 1879, and from that time until his death, in 1925, he wrote short stories and novels chiefly about the Creoles. Grace King (1852-) also wrote many charming stories of Louisiana.

Mary Wilkins Freeman, who was born in Randolph, Massachusetts, in 1862,

has given us tales of village life. She has drawn for us the colder, harder side of New England life. The New England of which she writes is not the New England that Longfellow knew, nor has it the homeliness pictured in Whittier's *Snow-bound*; for when Mrs. Freeman was a girl the restlessness that always follows war time and the promise of rich, new land in the West had tempted thousands of the more vigorous of the younger people to set out on adventurous journeys

over the long trails such as we read of in Hough's novels. Consequently life in the small New England towns had grown grimmer and more bare, and the shadow of its harshness fell on her young life and shows itself in her writing. You can see it in *Jerome, the Story of a Poor Young Man*, who in spite of obstacles grew above the shadows, and it can be felt even more in her short stories, which give a good picture of the end of Puritan times.

Many of the stories by these writers are in the dialects of the places in which the scenes are laid, and this plan was also followed by James Whitcomb Riley, "the Hoosier Poet," who lived from 1835 to 1916. Riley wrote simple poems, some of them in dialect and some in plain, simple English, which won the hearts of both parents and children. He was so much beloved that in some places the schools observe Riley Day. Eugene Field, another gentle poet of the Middle West, who lived from 1855 to 1895, was a Chicago newspaper-man and wrote many poems for and about children.

Helen Hunt Jackson (1831-85), the



Photo, courtesy Harper & Bros.
William Dean Howells.

daughter of a professor at Amherst College, is best remembered by *Ramona*, a fine novel in which she told of the wrongs imposed on the Indians of California. She was able to sympathize with trouble, for her own life had much sorrow in it. While she was in the West, where she went for rest and change, she became interested in the Indians and studied them. She then wrote *Ramona*, which gives us the best account that we have of the Mission Indians and the Spanish families who were living in California when it became part of the Union.

Thomas Nelson Page, who was born in Virginia in 1853, remembered the Old South; and after the Civil War and Reconstruction days were over he wrote tenderly about the old times. Children like *In Ole Virginia*, *Two Little Confederates* and *Santa Claus's Partner*. Marse Chan is one of his best books, and in *Red Rock* he tells about Reconstruction times. In 1913 he was made ambassador to Italy, and upheld the honor of the country there during the World War. He died in 1922.

A GROUP OF FAMOUS AMERICAN HISTORIANS

We have given most of our space to poets, essayists and novelists, but there is another group of men who deserve to be ranked as makers of literature. They have dealt with facts and not with fancy, but the ability needed to make the dead past live for us is quite as great as that which creates an imaginary scene. Some of these men won recognition in Europe before the writers of other literary forms.

The one we shall mention first properly belongs in a former section, for his life began and ended before the Civil War. This is the historian of Spanish conquest in America, William Hickling Prescott. We did not find room for him in the earlier chapter and here tell of him with the other historians.

William Hickling Prescott was born in Boston in 1796 and was the son of a distinguished lawyer. He graduated from Harvard in 1814 when only eighteen years of age. While a student he lost the sight of one eye and injured the other, but he determined, nevertheless, to become an author. His family was wealthy, and so he was able to employ secretaries to read to him and to take his dictation. He studied the literature of many European countries and began to work upon

Spanish history in 1826. Twelve years later he published *The History of the Reign of Ferdinand and Isabella*, which was soon translated into French, Spanish and German.

This was only a beginning. Six years later *The Conquest of Mexico* appeared. This is probably his best work. Four years later he published *The Conquest of Peru*, which added to his fame. Then he began the story of Philip II, the gloomy king of Spain. Two volumes appeared in 1855, but ill health did not allow him to finish. He died in 1859.

Modern students of history have shown us that some of the accounts of explorers that Prescott trusted are not altogether reliable, but his histories remain to this day the most interesting story of Spain in the New World.

GEORGE BANCROFT, HISTORIAN, DIPLOMAT AND ORATOR

Now we come to a group of men who began to write before the Civil War but did not complete their work until after the struggle. George Bancroft, scholar and statesman, was born in Worcester, Massachusetts, in 1800, and graduated from Harvard College before he was seventeen. American colleges then were little more than high schools, and Bancroft had heard of the famous German universities. So for three years he studied in three different universities and traveled through Europe.

On his return he began to teach in Harvard, but was not happy there and founded a school of his own in Northampton. In 1834 he published the first volume of his *History of the United States*, which he was not to finish until fifty years later. By this time he was well known and was appointed Collector of the Port of Boston, where he made Nathaniel Hawthorne one of his clerks.

President Polk appointed him Secretary of the Navy in 1845, and while holding this office he founded the Naval Academy at Annapolis. The next year he was appointed minister to England and served until 1849. Tired of public life, he devoted himself to study and writing. But he was not allowed to follow his inclination. In 1867 he was appointed minister to Prussia, and then to the new German Empire, where he was very influential. He asked to be allowed to return home in 1874, and lived in Washington until his death, in 1891.

The last volumes of his history, which ends with the inauguration of President Washington, were published in 1882. Besides he wrote many short articles, and many of his orations have been published. His history has been translated into Danish, French, German and Italian. Many consider him the foremost American historian.

MOTLEY, THE DIPLOMAT

Another man whose life was divided between literature and diplomacy was John Lothrop Motley, who was born in Dorchester, now a part of Boston, in 1814. He, too, was only seventeen when he graduated from Harvard, and also went to study in Germany, where Bismarck was a fellow-student. He then began the study of law, but did not like it. For a little while he was secretary of legation in Russia. He determined to devote himself to literature, and published two novels now forgotten. He became interested in Dutch history and in 1851 went to Europe to gather material. In 1856 he published *The Rise of the Dutch Republic*, which created a sensation and was translated into many lan-



James Whitcomb Riley.
From the painting by John S. Sargent.

guages. Two volumes of *History of the United Netherlands* appeared in 1860, and two more in 1867. President Lincoln appointed him minister to Austria in 1861. In 1867 he resigned, but two years later was appointed minister to England, a position which he loved. Because he was a friend of Senator Sumner, with whom President Grant had quarreled, he was recalled in 1870. The last years of his life were spent in

England, where he published *The Life and Death of John Barneveldt*, the Dutch patriot. After several years of ill health Motley died in 1877.

THE MAN WHO WROTE OF FRANCE IN THE NEW WORLD

Prescott began the story of Spain in the New World but never finished it. The story of the rise, decline and fall of the French power was the work of another Bostonian, also a graduate of Harvard—Francis Parkman. The similarity goes farther. Both had weak eyes and had to depend upon others to make their researches for them, but both, fortunately, were able to pay for such service.



Photo, Ewing Galloway.
"The old Swimmin' Hole," now in the Riley Memorial Park.

Francis Parkman was born in 1823 of old New England stock. Among his ancestors were many clergymen and others prominent in the history of the section. While a student at Harvard, from which he graduated with high rank in 1844, he determined to write the story of the French and Indian War, by which France lost Canada. Later the ambition grew into the idea of writing the whole story of the French exploration and occupation of America.

For a time he lived in a Passionist monastery in Italy in order to gain understanding of the psychology of the devoted monks. This knowledge was later of much value to him in writing of the Jesuit missionaries in New France. Then, in order to understand the Indian before he had been changed by the white man, he made an expedition to the Far West, where he lived for months with the wild Sioux. His experiences on this expedition were told in the book *California and the Oregon Trail*.

**THE DIFFICULTIES UNDER WHICH
THE GREAT WORK WAS WRITTEN**

Just now his health failed permanently, and he was never well afterward. Nevertheless, he began writing *The Conspiracy of Pontiac* in 1848, and finished it three years later. It was fourteen years before he could publish another volume, *Pioneers of France in the New World*, which appeared in 1865. The other volumes appeared at shorter intervals, but seven times he visited Europe in search of material.

The order of the succeeding volumes was as follows. The Jesuits in North

America was published in 1867, and *La Salle and the Discovery of the Great West* appeared in 1869. After five years *The Old Régime in Canada* was given to the public, and then in 1877 *Count Frontenac and New France*. It was seven years later before *Montcalm and Wolfe* was published. Finally, in 1892, over forty years after he had begun, the task was completed with *A Half Century of Conflict*.

Many students consider him the greatest American historian. His task

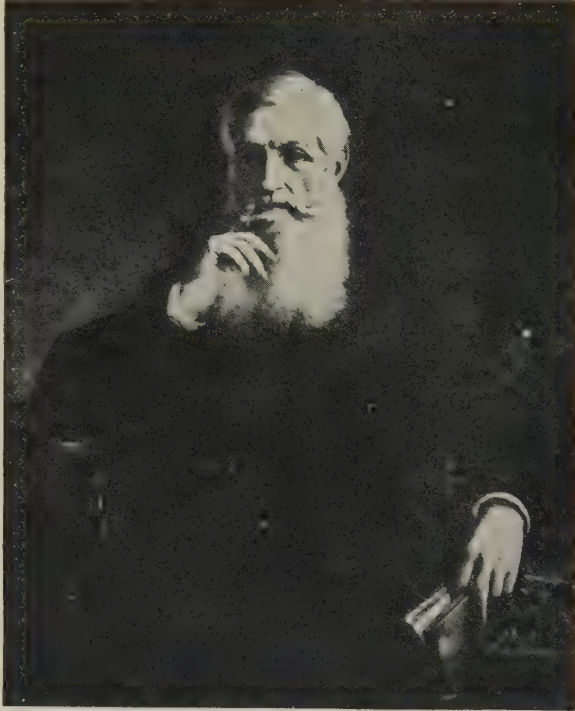
was difficult in many ways, and not many men could have succeeded. He was not only a great scholar, but he was able to understand the motives of the men, white and red, of whom he wrote, and was at the same time a literary artist. His name is always mentioned with profound respect by historians.

Outside of his main work Parkman was much interested in gardening, and originated several varieties of flowers. In

fact, he served for a year or two as professor of horticulture in Harvard, and published *The Book of Roses*. He died in 1893, only a year after his great work had been completed.

**JOHN FISKE, PHILOSOPHER,
SCIENTIST AND HISTORIAN**

A writer of a later time divided his energies between philosophy and history. His real name was Edmund Fiske Green, but he took the name of his great-grandfather, John Fiske. He was born in Hartford, Connecticut, in 1842, and graduated from Harvard College and the Harvard Law School. He lectured for a time at Harvard and at Washington



George Bancroft—From the portrait by Gustave Richter.

University, St. Louis, but finally devoted all his time to writing. His works on philosophy, a dozen volumes or more, were widely read, but his chief claim to fame rests upon his writings in American history, eleven volumes. His admirable style and his gift of clear statement have interested many people in American history, though specialists in history have criticized some of his statements and conclusions. He died, worn out by overwork, in 1901.

Another man who became a historian after he had been successful in other lines was Edward Eggleston (1837-1902). He was born in Vevay, Indiana, was largely self-educated, and became a Methodist minister. Later he became an editor and wrote many stories of life in the early communities in Indiana, of which *The Hoosier Schoolmaster* and *The Circuit Rider* are most read. They are really history in disguise. Afterward he turned to formal history and wrote *The Household History of the United States*, *The Beginners of a Nation*, *The Transit of Civilization*, and others.

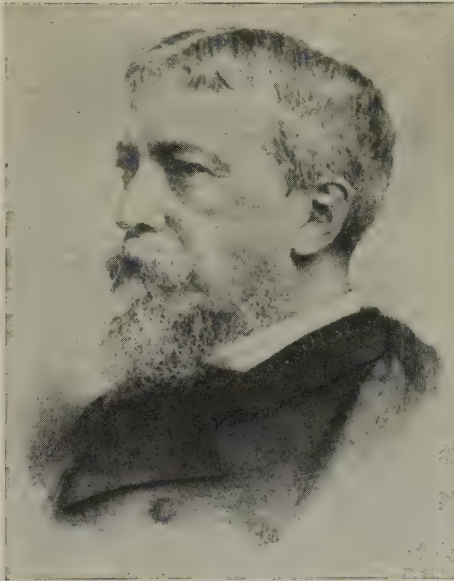
Two or three more should be mentioned. John Bach McMaster (1852-) was born in Brooklyn, graduated at the College of the City of New York in 1872, and studied engineering, but, in 1883, became professor of American history at the University of Pennsylvania. His great work, *A History of the People of the United States*, 1783-1861, was published in eight volumes between 1883 and 1913. He also wrote many other historical works.

James Ford Rhodes (1848-) was born in Cleveland, Ohio, and studied at New York University and the University of Chicago. After making a fortune in coal, iron and steel, he retired and devoted himself to his *History of the United States from the Compromise of 1850*, eight volumes. He has written several

other historical works. President Roosevelt's fame in other directions has made many people forget his historical work. We tell more of it on page 5007. Several other historians might be mentioned, but lack of space forbids.

WRITERS OF HISTORICAL TALES

Between 1880 and the end of the century historical novels became popular. They roused interest in the study of history and brought fame to their writers. One of the first to write these stories was Silas Weir Mitchell, who lived from 1829 to 1913. He was a well-known physician



Silas Weir Mitchell.

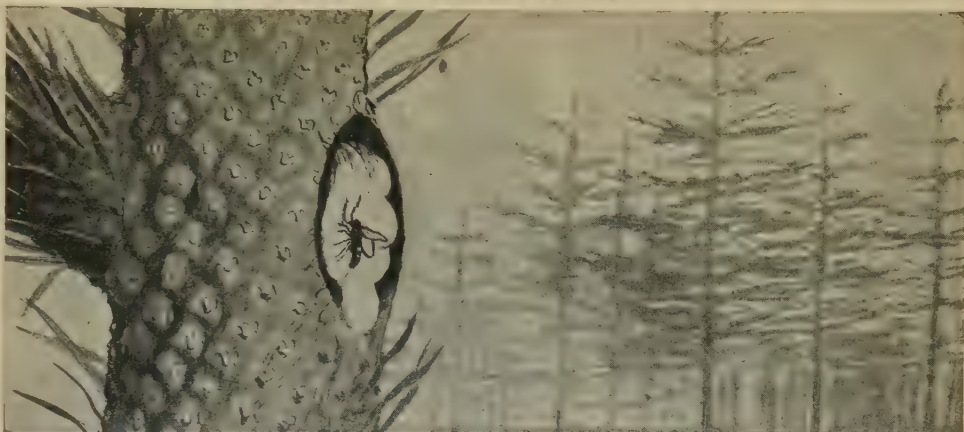
of Philadelphia who wrote for his own pleasure. Three of his books, *Westways*, *Hugh Wynne*, and *The Red City* are interesting tales of Revolutionary times. Mary Johnston, a native of Virginia, was another student of history. She wrote it in the form of stirring tales of adventure. *Prisoners of Hope*, and *To Have and To Hold* are stories of the early days in Virginia; *The Long Roll* and *Cease Firing* are thrilling tales of the Civil War; and in *Sir Mortimer* she has given us a vivid

picture of the finest ideals and most courtly graces of "the spacious times of great Elizabeth." Paul Leicester Ford, in *Janice Meredith*, and Winston Churchill, in *Richard Carvel*, give warmth and color to the history of Revolutionary times. Later books by Mr. Churchill are *The Crisis* and *Coniston*.

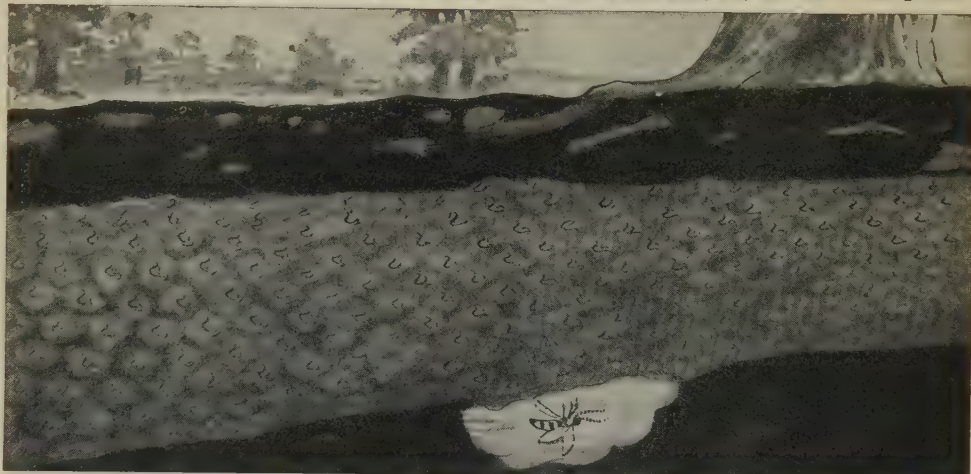
General Lewis Wallace (1827-1905), better known as Lew Wallace, who had a long career as soldier, lawyer, governor of New Mexico and minister to Turkey, wrote *The Fair God*, a romance of the conquest of Mexico, but became famous through the publication of *Ben-Hur*, a story of Rome and Palestine at the time of Christ. The story is still widely read, and has been made into a play.

THE NEXT STORY OF LITERATURE IS ON PAGE 5007.

WHY THE FLY IS FOUND IN THE AMBER



Perhaps a hundred thousand years ago—perhaps a million—a fly flew up against the resin oozing from a fir tree. It was held fast by a sticky fluid. Long afterward the tree died, too, and fell to the ground.



Here we see the tree lying after hundreds of years have passed, with the new layers of earth above it, sending out other trees. The resin, here greatly exaggerated in size, is hardening all the time.



Men come and go, trees rise and fall, the years grow into ages, and ages pass away, but the fly is in the resin still, and the resin has hardened into amber. So we have perfect bodies of tiny insects.



One of the famous Brock fountains of fire.

HOW DO FIREWORKS GET THEIR COLORS?

WE have all watched the vivid colors in the sky when fireworks are fired, but how many of us know that the science of fireworks is a very real one, demanding a considerable amount of chemical knowledge? The name given to firework-making among chemists is *pyrotechnics*, from a Greek word for the "art of making fire."

In practically every chemical laboratory every day miniature fireworks are made and used by chemists, for it is by the colors of flames that he can most easily detect some particular elements. By burning a bit of a substance which has to be analyzed in a hot flame, the color given to the flame will often give an indication of what the substance is—if the substance is one which does give color to a flame, though most substances do not.

The elements that make beautiful colors are easily recognized by the chemist by the flame test, and it was through knowing these colors that the chemist turned his thoughts to making fireworks. Colored lights have long been used by ships at sea for certain signals. Star shells and Verey lights are also used for night operations by troops on land. One of the latest and most horrible achievements of the firework man is the invention of the apparatus for producing large quantities of dense smoke which the airman can

CONTINUED FROM 4596



control when engaged in sky-writing at a tremendous height.

The color of a flame is due to the element itself. It is a wonderful secret of nature, and has its origin in the lightning-like vibrations in the atoms. These vibrations set up the waves in the ether which we recognize as blue or red or yellow light. Thus barium salts give a green flame, strontium salts a red flame. It does not matter whether we use strontium chlorid or strontium sulphate: it is the strontium that gives the characteristic crimson color to the flame.

The pretty little stars made by the dinner-table fireworks in Christmas crackers are caused by tiny filings of iron, which burn with a fierce but rapid flash, giving the appearance of a star. There are, of course, many colors which can be introduced into fireworks. Sodium salts give golden effects, lithium salts red colors, copper salts blue flames, and so on. Some of these compounds require greater heat than others to make them burn brilliantly, and here again the science of the firework-maker must come in so that the heat of the firework flame is hot enough to get the proper effect at the right time. Some of the effects which are secured are very charming, and are a never-failing cause of wonder both to old and young.

HOW BIG IS THE GULF STREAM AND HOW FAST DOES IT FLOW?

The Gulf Stream, the most rapidly moving of all the ocean currents, is that portion of the equatorial drift which has passed through the Caribbean Sea and the Gulf of Mexico. Having flowed into the Gulf of Mexico quite easily, it finds itself considerably inclosed and has to obtain some way of escape. The easiest path is the narrow passage between Florida and Cuba, and in that confined outlet the Gulf Stream becomes concentrated like water in the nozzle of a hose.

When it is passing through the channel at the end of the Yucatan peninsula its speed is only about a quarter of a mile an hour, and its width is ninety miles, while its depth is almost a thousand fathoms, or considerably over a mile. When it emerges from Florida its width has narrowed down to fifty miles, and its depth is only 350 fathoms, or less than half a



The way the Gulf Stream goes.

mile. At the same time its speed has increased to four miles an hour, the swiftest movement in its whole course.

Soon after escaping from this narrow passageway the Gulf Stream becomes wider and deeper once more, and its rate of progress is slower—only about ten or fifteen miles a day. Then, as the current loses speed, its boundaries become less well defined, and in the open ocean it is detected more by its temperature, color and life than by its motion. It is estimated that every day the Gulf Stream carries past Florida 436 million million tons of water.

The Gulf Stream is warm because it is composed of water that comes from the Tropics, where the hot rays from the overhead sun pour directly down and heat the upper layers of the sea.

CAN ONE PLANT PRODUCE THOUSANDS OF SEEDS IN A SINGLE SEASON?

Kerner, the German botanist who gave years of study to this subject, gives this list of plants with the average number of seeds produced by each in a single season:

Henbane . . .	10,000	Fleabane . .	120,000
Radish . . .	12,000	Tobacco . .	360,000
Shepherd's purse	64,000	Flixweed . .	730,000

But these are as nothing compared with the number of seeds produced by some of the orchids. One of these, the *acropora*, was estimated by Darwin to produce 74 million seeds in a season. Even that is small compared with the production of ferns, most of which produce spores far in excess of any seed-bearing plants. Some of the ferns produce hundreds of millions of spores. It is not at all uncommon for some species to produce a thousand millions. The fungus is even more prolific, as we can understand when we realize that the cloud of dust from a bursting puffball is made up of millions of tiny spores.

But the bacteria are the most wonderful of all plant forms, from the production point of view. A well-known scientist states that under suitable conditions and in a suitable temperature a cell of the *bacillus subtilis* will take about twenty minutes to divide into two. If this process were repeated continuously, and every cell thus formed did the same, the product of one germ in a single night would amount to over 130 millions.

Even with seed-bearing plants the results of production would be amazing should every seed become a plant and every plant yield seed. If a henbane plant developed 10,000 seeds in one year and 10,000 plants grew from these, producing 10,000 seeds each, at the end of five years there would be 10,000 million million plants, which would produce a 100 million million million seeds, and the whole of the dry land on the earth would be occupied with growing henbane plants. Another plant, the flaxweed (which is a species of hedge mustard), would, if unchecked for three years, produce enough plants to cover the land surface of the globe many times over. Nature is amazingly prolific in maintaining the plant world, but, of course, the enemies against which the plants have to contend are many, and the majority of seeds and young plants are destroyed. This is fortunate, on the whole.

**WHY DOES A PIECE OF ICE MAKE
A DRINK COLDER?**

A piece of ice put into a drink, as often happens in summer, melts, and it melts by absorbing heat from the drink. Everything, as it melts, absorbs heat, and the heat is taken from the body in which it melts. But the heat is used up as energy and is no longer to be detected as heat. Therefore, as the heat taken in, used up as energy, is absorbed from the liquid itself, the liquid necessarily grows colder. There is not much perceptible heat in a cold drink, perhaps, but it is there, all the same; in any case, there is more than in the ice, and so the ice draws some of it out of the liquid and uses it up as energy. Heat, having been used up, disappears, and leaves greater cold behind. So much heat is abstracted in the case of snow and salt melting in water that a very low temperature may be reached.

**WHY DOES BOILING MAKE
AN EGG HARD?**

There are certain kinds of chemical compounds with a name which really means "like glue," and when these things are heated to a certain point, they turn firm, or stiff. They have very big molecules, each made of a large number of atoms; but we do not yet understand why they should behave in this way. One of the best examples of them is white of egg, or albumen. Albumen means "white." When an egg is heated only to the temperature of boiling water, all the albumen of the egg turns solid. The same thing would happen to the albumin of blood, which is very much like white of egg; that is one of the reasons why eggs are such good food. There are other things which behave in a curious way when heated. Nearly all salts are much more easily melted in water when it is hot than when it is cold; but there is a salt of lime—the salt made when lime is combined with the acid found in lemons—which melts readily in cold water, but unmelts and appears again when the water is made hot. We do not know why this happens.

**COULD THE EARTH SUPPORT ALL THE
THINGS THAT ARE BORN?**

No. The average number of fishes in the sea seems to be about the same; yet one female fish may produce a million eggs, of which only one or two will live. A single microbe, if there were food enough, would multiply into millions in

a few hours. Rabbits introduced into a country like Australia, where there was a lot of food for them and few enemies, became a pest in a few years. Nearly every kind of plant and animal, high or low, tends to multiply too rapidly for the space or the food supply. When we look closely at the facts we find that the reason why so much that is born does not live is simply that the earth cannot sustain them all. The struggle for life that goes on without ceasing among all creatures is chiefly a struggle for food supply; and there is always a much smaller food supply than is needed for the quantity of young life.

**WHY DOES A FALLING OBJECT
TURN ROUND?**

A falling thing turns round because a turning motion is given to it when it begins to fall, or by air currents. If we dropped a ball in such a way that every part of it was let go at exactly the same moment, it would probably not turn round. But almost always, when anything is let fall, a turning motion is given to it, just as it is given to a rifle bullet, and it goes on turning. Even when this does not happen, an object may be so shaped that one part offers more resistance to the air than another. That part will be retarded as the object falls, and so it will acquire a turning motion. This turning affects the flight of anything through the air, and in the case of a ball it affects the way it bounces. So that in hitting a tennis-ball we try to "put a twist on it," and this may make it swerve in a curious line.

**WHY DO SOME PEOPLE LOSE
THEIR HAIR?**

Probably the chief reason why many people get bald is that they do not trust the hair to do its natural work, which is to protect the head. Hats interfere with the ventilation of the scalp, and the hair is poisoned. All our clothing should really be loose enough to allow of free ventilation, and it should be made of something that allows the air to pass. A hat squeezing the arteries starves the hair, and by squeezing the veins it interferes with the return of blood from the scalp, which gets filled with stale blood. Women do not get bald so often as men, probably because their hats do not interfere so much with the ventilation of the scalp. Of course, some people become bald because of disease.

**HOW DOES THE SUN
MAKE A RAINBOW?**

A rainbow always appears in the sky opposite to the sun, so that the observer looking at it must have his back to the sun. It is due to a bending and reflection of the sun's rays when they are shining on raindrops in the sky. The white light of the sun is composed of rays of all the colors of the rainbow mixed together, but when this white light passes through a drop of rain the rays composing it are bent to different degrees, and so forced apart. When they reach the back of the raindrop, these separated rays—violet, indigo, blue, green, yellow, orange, red—are reflected back to the eye.

That is the principle of a rainbow. If we make a hollow ball of thin glass and fill it with water, so as to have a sort of giant water drop, we can see the different colored rays reflected from the concave back of the ball as the drops of water reflect them back in the rainbow.

**WHY IS A RED-AND-WHITE POLE
BEFORE A BARBER SHOP?**

The barber's pole does not mean at all what it once did. It is an interesting survival which reminds us of some curious customs and beliefs of our ancestors in Europe hundreds of years ago.

Long ago in Europe the barber was often called the barber-surgeon, and performed many small surgical operations, as well as shaving and cutting or dressing hair. Until less than a hundred years ago it was generally believed that many illnesses could be cured by opening a vein and drawing a quantity of blood. This operation was known as "bleeding," and was usually done by the barber-surgeon. Before the barber's shop was hung a red pole with a bowl and a white strip of cloth hanging from it. The red represented the blood which was to be caught in the bowl and the cloth the bandage. Though a barber no longer pulls teeth or "bleeds" people, a sign painted to represent the old sign of the barber-surgeon is still placed before his shop.

**WHAT BECOMES OF THE STARS
IN THE DAYTIME?**

The stars in the daytime are just where they are at night, and if something could be put over the sun we should see some of them again. Something is put over the sun sometimes, for the moon comes in the way, so that for a time it cannot

be seen, even though it is daytime and there are no clouds in the sky. When that happens, one of the most wonderful things in the world is to see the stars "come out again."

Men who are working at the bottom of a pit or a well are supposed to be able to look up at the little bit of sky above them and see the stars almost as brightly in the day as in the night. This, however, is not the case, as you may prove if ever you go down a deep pit.

**WHAT IS ARTIFICIAL SILK
MADE OF?**

Artificial silk is an imitation made chemically from wood-pulp, or the cellulose of cotton fibre. For a hundred years or more men tried to find some substitute that would rival real silk in appearance, but it was only in 1884 that a French scientist, Count Hilaire de Chardonnet, solved the problem.

He had been experimenting for many years, and had gone to the extent of analyzing the caterpillar of the silkworm moth in all its stages of growth, as well as the leaves and wood of the mulberry tree on which it feeds. At last he was able to produce a substance that was much like silk by working upon cellulose obtained by grinding up the wood of the mulberry's trunk and branches. In 1891 he organized a little company, and the business of manufacturing artificial silk began in France.

The work went very slowly, however, and it was only after 1903, when an English scientist named Stearn invented a new and better process, that the great industry of making silk from vegetable substances began in earnest. From 1910 the industry increased by leaps and bounds, and within a few years the United States alone was producing twenty-five million pounds of artificial silk a year, half as much as the world's total output of natural silk. On page 5310 you can read about the artificial silk called Rayon.

**WHY DOES HOT WATER CRACK THICK
GLASS MORE EASILY THAN THIN?**

Hot water cracks a thick glass more easily than a thin one because the heat causes the expansion of the inner layer of the glass, while the outer layer is still cool and unexpanded. The result of this is that the expansion of the inner layer tears the outer layer, and so the glass is cracked right through.

THE NEXT WONDER QUESTIONS ARE ON PAGE 4949.

WHAT THIS STORY TELLS US

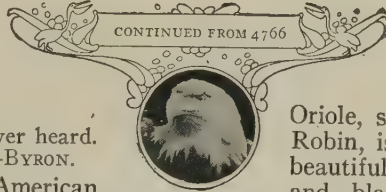
IN this story we read about some more of the feathered inhabitants of our fields and woods. Nearly all the birds spoken of here are song birds, and each one does its little best to help in the chorus of joyous song that fills our woods and gardens with sweet sounds throughout the spring and early summer. We also find that nearly every one of them destroys thousands of insects which would harm our crops. Even those which eat berries and fruit do more good than harm. The birds are so well described that we may easily learn to distinguish the birds and their songs and have the pleasure of knowing the names and the habits of the birds that nest in our orchard trees, down in the "bush," or in the fence corner of the meadow by the lane.

BIRDS OF NORTH AMERICA

LAND BIRDS OF THE NORTHERN PROVINCE: PART II

A LIGHT broke in
upon my soul—
It was the carol of a
bird;
It ceased—and then it
came again,
The sweetest song ear ever heard.

—BYRON.



of the meadow-lark
is a clear, plaintive
whistle.

The Baltimore
Oriole, sometimes called Golden
Robin, is loved by all. In its
beautiful plumage of orange
and black it reminds us of

In our first story of American
birds we spoke chiefly of those birds
which remain in the North the year
round, though we did mention a few
migratory birds. Most of the follow-
ing are with us only in the summer.
They include our best singers and our
most brightly colored birds.

The Meadow-larks are not larks at
all, but are relatives of the black-
birds, though they differ markedly in
habits. In walking through grassy
fields, meadows or marshes we some-
times flush rather large brownish birds
which, alternately flapping and sailing,
fly away. The white outer tail feath-
ers show plainly whether the bird is
flying or nervously flirting its tail after
it has alighted on a tree or fence. The
upper parts are dark in color; a line
from the bill over the eye is yellow; a
black crescent spans the breast; the
throat, breast and upper belly are
bright yellow; and the sides and lower
belly are whitish, spotted or streaked
with black. On the ground it builds
its nest, and lays from four to six white
eggs about one inch long, and spotted
and speckled with brown. The song

stories of the gorgeous plumage of
tropical birds, and seems out of place
among the more soberly clad inhabit-
ants of Northern climes. The head,
neck, throat and upper back are black;
and the breast, belly and lower back are
a rich reddish orange. It breeds in
Eastern North America, and winters
in Central America. The nest of the
Baltimore oriole is most interesting.
It is made of grasses, plant fibres, hair,
strings and bark firmly interwoven,
and is hung between two twigs from
near the extremity of a limb from
twenty to forty feet high. The con-
struction work is done by the female,
who, though not so brightly plumaged,
is a more highly skilled weaver than
the male. The young birds cry cease-
lessly for food—a monotonous *dee—
dee—dee—dee*, until one of the parents
arrives and stops their mouths. This
bird is one of the greatest destroyers of
hairy caterpillars. The tussock, gipsy,
browntail, tent and forest caterpillars
and the fall webworm are all greedily
devoured by this species. For variety,
curculios, wasps, bugs, plant-lice, scale

insects and flies are eaten, while cultivated fruit is occasionally eaten as a relish.

The Orchard Oriole is not so brightly colored. The head, neck and upper parts are black; the breast, belly and lower back are chestnut. This bird dresses quietly, but with excellent taste; his nest is of choicest materials; and the song, which no words can describe, is a finished effort.

THE GENTLE CUCKOOS WITH THEIR MOURNFUL SONG

Cuckoos are not very common in this region. The Yellow-billed Cuckoo occasionally breeds in Canada. It is a long, slim, dove-like bird; with upper parts brownish gray, with a greenish gloss; under parts dull whitish; outer tail feathers black tipped with white; and the lower mandible yellow. It is distinguished from the more common Northern species, the Black-billed Cuckoo, by its yellow lower mandible, reddish wing feathers, and black, white-tipped tail feathers, which marks are absent in the latter. The two species are alike in habits. They are insect-eating birds, and are particularly fond of tent-caterpillar larvæ. Cuckoos are of quiet and retiring habits, and on account of their mournful notes are often regarded with awe by the superstitious. Their short rounded wings and long broad tails give them a silent, gliding flight. The nests are flat, shabby platforms of twigs placed on the lower branches of trees. The eggs are greenish blue and over one inch long. Only the European cuckoos lay their eggs in the nests of other birds. Our cuckoos arrive in May or June, and leave in September for Central or South America.

A FEATHERED FISHERMAN AND HIS NEST IN THE BANK

The Belted Kingfisher is found about ponds, lakes and rivers, looking for small fish, which he catches by diving. The upper parts are bluish gray; the tail feathers have numerous spots and broken bands of white; the throat, a spot before the eye, and the breast and belly are white; a band across the breast and the sides is bluish gray, sometimes tinged with rufous. The nest is built at the end of a two- or three-foot tunnel in a sand bank, where five or more glossy white eggs are laid upon the sand. Silently the kingfisher perches on some limb overhanging the water, ever watching for a fish, his only food. Just as you reach the danger line

he drops from his perch, and with a loud, rattling call flies on ahead.

In size and colors the Blue Jay resembles the kingfisher, but his habits are quite different. Nearly three-fourths of the food of the blue jay is vegetable matter, seeds, nuts and fruits. One of his many faults is that of eating the eggs and young of other birds. The head of the blue jay is crested; the upper parts are grayish blue, marked with black and white; a black band passes across the neck, back of the head and across the breast; the tail is blue, with feathers barred with black and tipped with white. He is a mimic and a ventriloquist, and delights in teasing other birds. The nest is built in the crotch of a tree. The four to six pale olive-green eggs, thickly marked with brown, are an inch long.

The Canada Jay, named Whisky-Jack and Moose-bird by lumbermen, is common in Northern woods. The forepart of the head is white; the back of the head and nape sooty black; the back gray; the wings and tail gray; the throat and sides of the neck white; and the under parts ashy gray. Because of his puffy gray feathers, and general colors, he resembles a big chickadee. The Canada jay is not so shy as most birds, and soon becomes a pet about lumber camps, where he feeds on the food thrown out to him. Lumbermen claim that he is very fond of whisky, and they delight in making him "drunk." They nest early in March, while deep snow still covers the ground and frost reigns supreme in the woods. Neither species is migratory.

TWO BIRDS OF THE NIGHT

The Whip-poor-will is an interesting bird, often heard in the calm of the evening repeating his name, but not often seen. His colors resemble those of the bark of a tree—black, brown and buff, with touches of white. There is a narrow white band across the breast, and the end half of the three outer tail feathers is white. This bird breeds in Eastern North America, and winters in Florida or Central America. Two dull white eggs, with delicate, obscure lilac markings and a few brownish spots, are laid on the ground among leaves. It is a bird of the night, captures and devours numbers of the large-bodied moths that fly in the woods, and is also fond of mosquitoes.

Whip-poor-wills are often confounded

with the Nighthawk, but are easily distinguished by the long bristles from the base of the bill, the black chin and the rounded tail. In the male nighthawk the throat is white, and there is a white band across the tail. The forked tail and the white band across the wing readily distinguish it at a distance. The female lays two mottled gray-and-white eggs on the ground among rocks in pastures. The nighthawk passes the day perched lengthwise on a limb; but soon after sunset he mounts high in the air, flies erratically about, at irregular intervals utters a loud nasal *peent*, and follows it by two or three unusually quick, flitting wing-beats. He is coursing for insects, his principal food. He winters in South America. This bird is sometimes called the Bull Bat, and occasionally the Goatsucker.

THE EXQUISITE RUBY-THROATED HUMMING-BIRD

The Ruby-throated Humming-bird is a near relative of the birds we have just described. Though there are four hundred species of humming-birds, all American, this is the only one of the family with courage to leave warm, sunny, Southern regions and visit Northern countries. It is the smallest bird we have, less than four inches long; with upper parts bright, shining green; under parts dusky, washed with green; and throat beautiful metallic ruby-red.

The ruby-throat needs no song. Its beauty gives it distinction, and its wings make music. It seems ever on the wing, now hovering over a bright blossom for a moment and thrusting its long bill into the flower for honey or for insects, then flying away so swiftly that its wings are lost in hazy circles. The nest is of down, covered externally with lichens, and firmly wound with almost invisible plant fibres. The tiny nest, not much over one inch broad, is placed on a limb high above the ground. In it are laid two tiny white eggs about the size of a pea. Humming-birds are curious and fearless. They will probe a flower held in one's hand, or fly into houses and feed upon sugar placed on a table. Their food consists largely of minute insects.

Voyager on golden air,
Type of all that's fleet and fair,
Incarnate gem,
Live diadem,
Bird-beam of the summer day,—
Whither on your sunny way?

THE KINGBIRD—THE ACTIVE TYRANT OF THE WOODS

The Kingbird, a member of the Flycatcher Family, is every inch a king. Concealed under the feathers on the head is his crown of orange-red. He dearly loves a fight; and his scientific name, *Tyrannus tyrannus*, recalls the lives of kings of other days. The upper parts are grayish slate color; the tail black, tipped with white; and the under parts white. The nest of grasses and moss, firmly compacted, is placed high up at the end of a branch. The eggs, from three to five in number, are one inch long and are white, spotted with umber, in color. The kingbird has no love for crows, blackbirds, hawks and jays in particular; and should any of these approach his nest, they are reminded that other birds have rights which they must respect. He captures a vast number of mature insects, and thus renders a great service to the farmer.

Phœbes also are flycatchers and have all the food traits of the family. They are not too aggressive, and do no injury in any way. They nest in and about dwellings and under bridges. If unmolested, they will return year after year to the same nest. The colors of the upper parts are grayish brown, with an olive-green cast; the crown is greenish brown; the outer tail feathers whitish; and the under parts white, washed with yellow, and tinged with brownish gray on the sides. The bill is black. The phœbe is a devoted parent, and is seldom found far from home. There is something familiar, trustful and home-like in his ways. Perched on a bridge-rail or barnyard gate, he contentedly sings his humble, monotonous *pewit phœbe*, *pewit phœbe*. It is also called Pewee.

SOME OF THE OTHER FEATHERED INSECT-EATERS

The Wood Pewee is a near relative of the phœbe, and, like it, has gentle, pen-sive ways, voiced by his sad, sweet call. All day long he repeats his name—*pee-a-wee*; and these clear, sympathetic notes come from the canopy of green overhead during the peace and stillness of the hot midday hour, when summer heat has silenced more vigorous birds. The upper parts are very dark; the wings and tail greenish brown; and the under parts whitish, washed with gray on the sides. He winters in Central America, and breeds throughout North America, building a

nest of grasses and moss high up in a tree. One writer says: "I have seen one wood pewee catch and feed to its young forty-one insects in forty-five minutes."

Several other members of the Flycatcher Family are found in this territory. Of these, the Least Flycatcher, or Chebec, is the smallest and the most common. Its small size, the comparative absence of yellow on the under parts, and the generally horn-colored or brown lower mandible are the chief distinguishing characteristics. He salutes you with a business-like *chebec, chebec*, as he sallies after insects about lawns and orchards, which he prefers to the forest. The nest, built in a tree, contains from three to five white eggs.

The Crested Flycatcher is much larger, and has a sulphur-yellow belly, and a throat and breast of pearl-gray. His note is a loud whistle which pierces far through the clearing, as, full of life and vigor, in bright spring days he flies about in green tree-tops, chattering to himself or calling loudly as he goes. He often lines his nest with a cast-off skin of a snake.

Only one species of the Lark Family, the Horned Lark, is found in North America, but there are several varieties or subspecies. It comes from the North instead of from the South. These hardy birds visit us in flocks, and may be seen running over the snow or barren ground when few birds are about. They take wing with a sharp, whistled note. The forehead, a line over the eye, the ear region, and the throat are sulphur-yellow; the upper parts are grayish brown; a black patch crosses the breast; the under parts are whitish; and on each side of the head there rises a tuft of elongated feathers resembling a horn. It is from this tuft that the bird takes its name.

THE GROSBEAKS WHICH NEST IN THE FAR NORTH

The Pine Grosbeak is another winter visitor from colder Northern regions. The male is slaty gray, more or less strongly washed with rose-red. In the female olive-yellow takes the place of the rose-red in the male. Because of a general resemblance to the American robin, it is often called the Winter Robin. Its tail is forked, and the beak short and thick. It is very fond of the red berries of sumac and mountain-ash trees, which provide it with a nourishing diet.

The Evening Grosbeak, which has a black crown, wings and tail, and a yellow

forehead, rump and belly, is a hardy and distinguished inhabitant of Far Northern regions, which comes south to Manitoba and Ontario in winter-time, and occasionally is seen in the United States. It builds its nest in the North. The Rose-breasted Grosbeak and the Cardinal Grosbeak both nest in the region, but neither is common. They belong to the South.

The Purple Finch is much smaller. The male has the entire body suffused with rose-red; but the female bears a decided resemblance to a sparrow, except for the rounded bill, the tufts of feathers over the nostrils, and the forked tail. The purple finch is a garden bird, very fond of fruit, blossoms and buds. Its full song is a sweet-toned, carelessly flowing warble which bursts forth as if from a happy heart, particularly when he wishes to attract the attention and win the love of a demure female. It nests in conifers and lays from four to six blue eggs, which are spotted with brown about the larger end.

SOME BIRDS THAT LOVE THE SNOW

The little Red Poll, with his bright red crown, grayish brown back and pinkish breast, is one best known as a winter visitor. It comes from the North in flocks in search of food. It is affectionate and confiding, easily tamed, and makes an interesting pet.

The Snow Buntings, or Snowflakes, come south, when the chill season comes on in icy regions, in great flocks, and forage about barnyards and bare fields. They must find enough to eat, because they are always very fat and in good health and spirits. The whole head, neck, rump and under parts are white, with some black on the wings and tail. As long as the snow lasts the Snowflakes stay; but when warm, sunny days in spring arrive they betake themselves to Far Northern regions, and there build their nests and bring up their little families.

Another bird of the North is the Pine Siskin, which comes south in winter, sometimes venturing almost to the Gulf of Mexico. The upper parts are streaked with black and buff; the wings and tail are greenish brown, with yellow markings, which serve to distinguish it.

THE AMERICAN GOLDFINCH, OFTEN CALLED THE THISTLEBIRD

Few birds are held in such high esteem as the American Goldfinch, or Thistle-

SOME OF OUR COMMON BIRDS



The Wood Thrush is larger than the other thrushes and has a bright coat. He has a sweet song.



The Catbird, one of the friendliest of birds, makes its nest in hedges and thickets. His song is varied.



The Purple Finch, a garden bird, charms us with a sweet warble.



The Blue Jay has a crested head, and blue-and-white dress with black bars.



The female of the Red-winged Blackbird wears a brown dress.



The Meadow-lark, a rather large bird, lives in grassy fields, meadows and marshes, where its whistle is often heard.



The Orchard Oriole wears a sober dress of black and chestnut.

bird, a summer resident wintering in the United States and the warmer parts of Canada. The adult male is bright yellow, with black cap, wings and tail. The female is olive-green all over. As they bound through the air in undulating paths their joyous nature is expressed by the canary-like song which speaks of the wilds of nature and of a happy life. They are seed-eating birds, and may often be seen swinging from the ripened heads of a dandelion or a thistle as they eat the tufted seeds.

The nest of grass and moss, thickly lined with down, is placed in a bush or tree, and contains from three to six pale bluish white eggs not much over one-half inch long. When the young birds are placed in a cage, hung from the tree at first, and moved toward the house a few feet each day, the parent birds will feed them until they are old enough to eat the food given canaries. They do well in captivity, the male in spring putting on his coat of yellow and black, and singing his joyous song. The writer kept one for eleven years. It died evidently of old age.

THE MANY FINCHES AND SPARROWS IN OUR FIELDS

The Finches and the Sparrows constitute the largest family of North American birds, represented by many species. The sparrows, commonly called "gray birds," are common about roadsides and the farm during the summer months. In general, they build on, or near, the ground, and are brown in coloring. Their food consists chiefly of insects during the summer and of seeds in autumn. Since the young are fed on insects, and as there are two or three broods each season, this means a vast number of insects taken from crops. When the breeding season is over, sparrows gather into flocks, and may be found in large numbers in weed patches left about the farm. As winter comes on, they leave for the South. Many species take high rank as songsters.

Though there are many American sparrows, an importation, the European House Sparrow, better known as the English Sparrow, is the most common. This bird needs no description, as it is familiar to every one of you. It is a dirty, noisy, quarrelsome bird, and all agree that it was a great mistake to bring it to America.

The Chipping Sparrow is the smallest—so small that sometimes it hangs itself accidentally with a horsehair used in lining

its nest. The top of the head is reddish brown; the under parts nearly white; and the bill black. It is the humblest, most unassuming member of the family, making its nest in the vines about our porches, and feeding on the crumbs about our doorstep. Its song is a monotonous *chippy*, often repeated. The Winter Chippy, or Tree Sparrow, is larger, and, in addition to the size, is distinguished by an indistinct black spot on the centre of the breast. They come in flocks from the North when fields are beginning to look brown and dreary, and feed on the seeds of weeds and grasses. In spring they begin to sing a low, sweet, canary-like song.

SOME OF THE SPARROWS WHICH SING

The Song Sparrow, already referred to, is one of the best singers of early spring, and tells us that the winter is past. He strikes three or four strong notes, and then runs down the scale.

A joyful flourish lilted clear—

Four notes—then fails the frolic song,

And memories of a vanished year

The wistful cadences prolong;

A vanished year—O, heart too sore—

I cannot sing, thus ends the lay:

Long silence, then awakes once more

His song ecstatic of the May.

The crown is brownish, and the breast is marked with wedge-shaped marks of black and brown which tend to form a larger blotch at the centre. Its vivacious song may be heard by night as well as by day, and in all weathers; and though not a sociable species, it is one of the best known of all sparrows. It nests on the ground or in bushes, and lays four or five white or bluish white eggs with brown markings.

The Vesper Sparrow much resembles the song sparrow, but is distinguished by two outer white tail feathers which show when it flies. It is a spring migrant, wintering on the Atlantic coast and breeding in Canada. As you walk along a country road the vesper sparrow will run rapidly ahead of you, wait for you to catch up, then run ahead again. His song is clear, loud and ringing.

The Savanna Sparrow has no distinctive marks except pale yellow marks over, or before, the eye and on the bend of the wing. It is a common bird by roadsides and in fields, and chips vigorously at every passer-by as it bobs up and down on fence

posts. Its song is a weak musical trill, most audible toward sunset. Swamp Sparrows are distinguished by their unstreaked breasts and different song—a simple, sweet, monotonous *tweet-tweet-tweet*, repeated many times. They are rarely seen beyond the confines of a wet meadow or grassy marsh.

In early spring the Fox Sparrow, which is foxy red all over, and larger than the other species, is seen about damp thickets and roadside shrubbery foraging among the dead leaves. Its song is not surpassed by that of any of the sparrows. One may be sauntering along wooded fields enjoying the balmy air of evening and be halted by a beautiful new song. It is a solo at first—an emotional outburst rising full-toned and clear, and passing all too quickly to a closing cadence which seems to linger in the silent evening air. Then, of a sudden, the solo is succeeded by a chorus. From every side, and from a hundred throats, comes the same sweet melody—the song of the fox sparrow.

OLD TOM PEABODY, THE WHITE-THROATED SPARROW

The White-throated Sparrow, or "Old Tom Peabody," is the national song bird of Canada. Some say that he says *peabody*, *peabody*, but Canadians hear his song differently and declare that he plainly says: *I love dear Canada, Canada, Canada.*

Shy bird of the silver arrows of song
That cleave our northern air so clear,
Thy notes prolong, prolong,
I listen, I hear—
"I—love—dear—Canada—Canada—
Canada."

Shy bird of the silver arrows of song,
Shy poet of Canada dear,
Thy notes prolong, prolong,
We listen, we hear—
"I—love—dear—Canada—Canada—
Canada."

The centre of the crown has a white stripe, bordered on each side by much wider black stripes; and a white stripe passes from the eye backward along the side of the head. The throat is marked by a square white patch. There is little in their modest appearance to tell one, as they feed on the ground near their haunts, of their vocal powers; but suddenly a clear, sweet, plaintive song arrests one's attention, and we may hear the patriotic words of Canada's national song bird.

We must not leave the Sparrow Family without referring to a common bird, slate

color above, white below, flesh-color bill, and white outer tail feathers. It is the Junco, a welcome bird of early spring days, even though dressed in sober colors, and with a song seldom heard. The *tsip* of the Junco is known to all, but few have heard his low, sweet song, which is as unpretentious and cheery as the bird itself. It does not migrate to any great distance.

THE FLAME WHICH LIGHTS UP OUR WOODS

The bird of paradise in the Northern regions is the Scarlet Tanager. The male is bright scarlet, with black wings and tail. The female is more soberly clad, olive above and greenish yellow underneath. It nests as far north as Canada, but is not common anywhere. Its color is so vivid that it is an easy mark for anyone with a gun. Its song is a loud, cheery carol, suggesting the song of the robin. These beautiful birds are found in open woods, parks or orchards. They live on seeds, berries and insects. It winters from Mexico to South America.

SWALLOWS OF THE BARN, THE BANK AND THE WOOD

The swallows are denizens of the air. It is their domain, and it contains their food. In structure they are especially adapted for their life, having long wings, small feet and short, broad, deeply cleft bills fitted for catching insects. They are highly insectivorous, and are, therefore, of great benefit to man.

The Barn Swallow has upper parts of dark blue; forehead, throat and upper breast chestnut; lower breast and belly buff; and a deeply forked tail, showing white markings when spread. It builds a nest of mud and grass, lined with grasses and feathers, and fastens it on the rafter or beam of a barn or other building. The eggs are white, with numerous brownish spots. Barn swallows rank first among a family of birds famous for their power of flight. In search for insects they skim low over the fields, turn quickly to right or left, up or down, and pursue their marvelous course with ease and grace.

The Bank Swallow has brownish gray upper parts, a white throat, and a brownish gray band on the breast. It builds a nest of grasses and feathers in a hole in a sand bank two or three feet from the entrance. It may be generally known from other swallows by the small size, absence of metallic coloring, and the nesting hab-

its. The Cliff, or Eave, Swallow has a whitish forehead; steel-blue crown and back; chestnut throat and sides of head; brownish gray breast; and greenish brown tail feathers of nearly equal length. Its nest is of mud, pocket-shaped, with an opening at one side above, and fastened beneath a cliff or the eaves of a barn. The birds will return year after year to their rows of mud tenements.

The Tree Swallow has upper parts of steel-green or steel-blue; under parts of white; and the tail slightly notched. They build nests of grasses and feathers in the hollow of a tree, or they may accept as substitutes for the tree the boxes erected by man.

THE PURPLE MARTIN DEMANDS A HOUSE FOR HIMSELF

The best-known of the swallows is the Purple Martin, which occupies houses or boxes erected for its occupation, if the English sparrow has not already taken possession of these before the martin arrives in late spring. The male is shining blue-black, with wings and tail duller. Martins not only drive away hawks, but they eat many injurious insects—beetles, in particular, for which they have a great fondness. They arrive in the spring just as the insects are beginning to become active. Every one eaten then means many fewer later in the year. Intelligent fruit-growers realize their value.

The Chimney Swift closely resembles the swallows in its habits, except that it never alights on the ground, even to obtain the materials for its curiously constructed nest placed on the inside wall of a chimney. The birds are smoke-colored; and spines on the end of each tail feather enable them to hang to the upright walls of the soot-lined chimney. The nest is made of twigs glued to each other and to the side of the chimney by the bird's saliva. The white eggs, from three to five in number, are long and narrow. Throughout the day numbers of swifts are scouring the air for their fare of insects; but as night approaches they return to the chimney, where there is a continuous and not unmusical twittering day and night.

THE CEDAR WAXWING, THE MOST POLITE OF BIRDS

The most polite and the best groomed of all birds is the Cedar Waxwing, often called Cedar-bird or Cherry-bird. The forehead, chin, and a line through the eye are velvety black; the head and the upper

parts are a rich grayish brown, with small red sealing-wax tips on some of the wing feathers; the belly is yellowish; and the tail has a yellow band at its end. The nest is placed in a fruit or shade tree, and the eggs are bluish gray, spotted with umber. The cedar waxwing is a common summer resident. Though very beautiful, it undoubtedly consumes a large number of cherries and currants and a few raspberries. On the other hand, it destroys many insects. It is particularly fond of the elm-beetle, which has done so much harm to our beautiful trees. They are very tame, and allow anyone to almost touch them while they are feeding. The note is an insignificant hiss. Their beauty and their gentle, refined ways make them seem superior creatures of the air which we must respect. The Bohemian, or Northern, Waxwing is rather rare. It has whitish bars across its wings.

THE BLOODTHIRSTY SHRIKES, WHICH EAT OTHER BIRDS

The Northern Shrike, or Butcher-bird, is a hawk-like, bloodthirsty bird which preys on small birds and impales them on a thorn, a fence barb, or a forked twig—hence the name butcher-bird. The male is ten inches long, with gray, black and white the prevailing colors. They are unable, because of the structure of their feet, to hold their prey while they eat it, so they impale it upon thorns or barbs and tear it to pieces with their hooked bills. They also feed on mice and noxious insects. The song consists of various whistles. They place their rude, bulky nests of twigs and weeds in thorny trees or shrubs and lay from four to six grayish white, spotted eggs over an inch long.

The Loggerhead Shrike has black upper parts and white under parts, and his habits are in general like those of the northern shrike. His notes are harsh and unmusical.

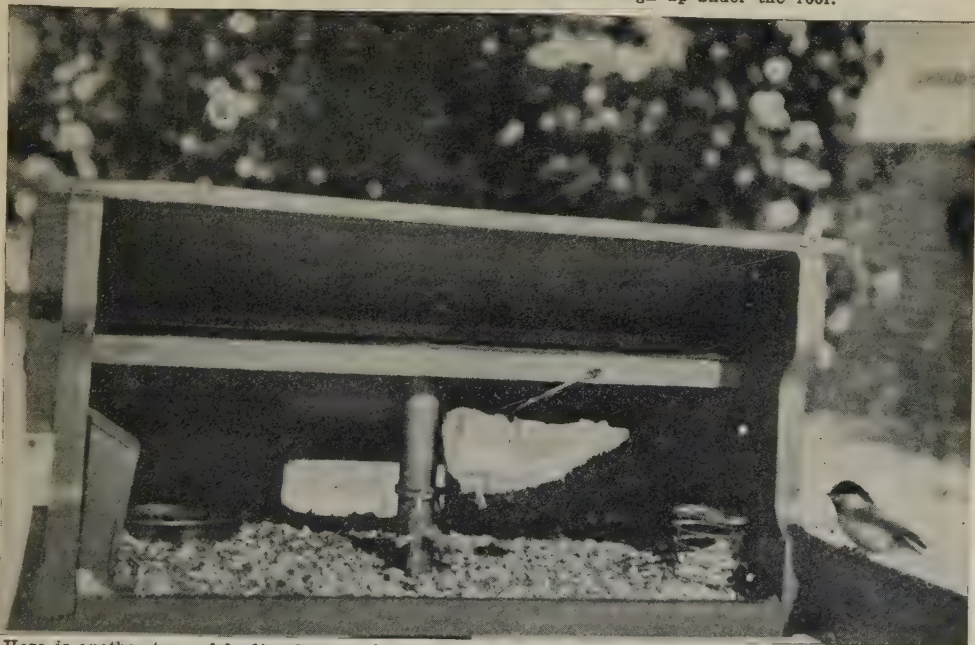
THE VIREOS, OR GREENLETS, AND THEIR HABITS

The vireos are small insect-eating birds confined to the Americas. They are slow in their movements, and lovers of trees, where they secure their food from crevices in the bark or from the under-side of leaves. With us the most common species is the Red-eyed Vireo, which has a slaty gray crown, bordered on either side by black; a white line over the eye; under parts pure white; and upper parts olive-green. The conspicuous white line over

WINTER FOOD FOR FEATHERED FRIENDS



During the cold winter the birds which remain all the year sometimes have a very hard time, unless their friends look after them. Here is a bird refuge with sheaves of grain, and litter in which grain may be scattered. Food of various kinds is also placed on the shelf high up under the roof.



Here is another type of feeding house. A great lump of suet is fastened firmly and there are vessels for water, and containers for food. This kindness is much appreciated by the birds which frequently visit it and also apparently tell their friends of the accommodations provided.

Photo, Kadel & Herbert.

the eye, with its black border, and the bird's red eye distinguish it from its relatives. It is a summer resident, wintering in South America. All through the spring and summer months the warble is heard from woodland and roadside, often becoming monotonous. It is delivered in parts, with intermissions of a few seconds between, from morning until night. He is called the Preacher, because he explains his subject in a few words, and then makes a pause for his hearers to reflect upon it. Translated, his sermon is: *You see it—you know it—do you hear me?—do you believe it?*

The Warbling Vireo is olive-green above, with no black border on the crown. The under parts are white, slightly washed with yellow. It breeds as far north as Hudson Bay, and winters in the tropics. Its song is a firm, rich, continuous warble. The Yellow-throated Vireo has bright olive-green upper parts; a white belly; and eye-ring and throat and breast bright yellow. He is a dweller in tree-tops, and his tune is deeper, richer and more deliberate than that of the red-eyed. He calls: *See me; I'm here; where are you?*

Several other vireos are more or less common. The Blue-headed, or Solitary, Vireo is, however, rather rare, and so is the Philadelphia Vireo. It is grayish olive above and greenish yellow below. Its song is very much like that of the Red-eyed. The White-eyed is one of the best singers of the group, but is also becoming rare in the region.

TWO SWEET SINGERS—CATBIRD AND BROWN THRASHER

From the coverts of the thicket comes a wondrous burst of song;

Tripping gaily, pressing, crowding, flood the liquid notes along!

'Tis the catbird, dear old Orpheus, with a heart as full of joy

As our quaint old Quaker poet, or his whistling bare-foot boy.

The Catbird is one of the most intelligent of birds. As the crows come into leafage in May, catbirds and thrashers fill the air with their delightful songs. We close our eyes and give our ears full enjoyment. The catbird, so-called because he can "mew" like a cat, is inclined to be friendly to man, and where he is well treated and his confidence won, will show himself delightfully familiar, coming around the veranda, answering one's talk, and singing for our entertainment. He is a charming singer. The song seems to

be made up as he goes along. It is an indescribable medley interspersed with various mews and calls.

His general color is dark gray, with a black cap, and chestnut under the tail coverts; and he is nine inches long. The nest is found in hedges or thickets, and is made of twigs, rootlets and grass, lined with fine black roots. The four eggs are plain greenish blue. In general, catbirds are lively, playful, full of pranks and quaint performances, and should be encouraged about our homes.

The Brown Thrasher calls from his lookout: *Shuck it, shuck it; sow it, sow it; plow it, plow it; hoe it, hoe it.* His song is a bright, cheerful carol, often long continued, but always clear and sweet. Above he is bright reddish brown; below, white with black spots; and the length is about one foot. He is an inhabitant of shrubbery and borders of woods, where he passes much time on the ground scratching among the fallen leaves. He is active, shy and suspicious, and does not like to be watched. The brown thrasher is a finished musician with rich tones and exact execution. Morning and evening, mounted on the upper branches of a tree, he pours forth his song in a way that makes it appeal to the heart and to the mind.

THE FRIENDLY WRENS AND THE HAPPY KINGLETS

The wrens belong to the same family as the thrashers, but are diminutive in size. The House Wrens are common in the southern part of the United States, but also breed in southern Canada. They are brownish above, with tail and wings barred, dull gray below, and barred on the flanks with brown. They are bold, sociable, confiding little birds, building their nests in bird-boxes erected for them. They feed wholly on insects, and are therefore beneficial. The song is loud and clear, and bubbles with enthusiasm.

The Winter Wren breeds in northern Canada or in the mountains of the United States, and winters southward. It is bright cinnamon above, paler below, with sides, wings and tail heavily barred with black. This is the shortest and most stoutly built of wrens, and looks very pert with its stubby tail erect over the back. They nest in brush heaps, tin cans, or in hollow stumps. The nest is lined with feathers, and the little eggs are white, sparingly speckled with reddish brown. The Marsh Wrens are shy, suspicious little

birds which are seldom seen near the habitations of man. They love low ground. Both the Short-billed and the Long-billed occasionally go as far north as Canada.

The kinglets are very attractive birds. Though very small, they are active, hardy little birds, and always seem to be happy. The Golden-crowned Kinglet has the centre of the crown bright reddish orange, bordered by yellow and black, with upper parts olive-green and under parts whitish. It builds a tiny hanging nest of mosses, bark and feathers high up in a tree, and lays nine or ten tiny eggs. Its song consists of a few chips or chirps and trills, but is surprisingly strong for such a tiny bird. The Ruby-crowned Kinglet has a partly concealed crest of bright red. The kinglets are usually seen flitting about evergreens. They breed in Canada, and winter in Mexico and Central America.

THE THRUSHES, THE GIFTED MUSICIANS OF THE WOODLAND

The thrushes are conceded first rank among song birds by all true lovers of music. Wilson's Thrush, or Veery, has the entire upper parts a uniform reddish brown. Below it is dirty white, with a few faint marks on the breast. It is found in swamps and in dry woods. The nest is on the ground and made of strips of bark and leaves. The eggs are greenish blue. These birds are shy and retiring, and live near the ground. All the wondrous mysteries of the woods find a voice in their song. It is a weird, ringing monotone of blended alto and soprano notes. It has neither break nor pause, nor does it seem to come from any one place. In fact, the bird is a ventriloquist, and has led many a bird-lover a weary tramp in searching for him on different trees while he has not moved from his perch. The song is like the syllables *vee-r-r-hu* repeated eight or nine times around a series of intertwining circles.

The Wood Thrush is distinguished from other thrushes by its larger size, its brighter cinnamon colors above, and the numerous large round black spots on its under parts. His song is very clear and flute-like, containing many notes of the scale; and as it rings through the woods like a hymn of praise, it invites one to yield to the ennobling influences of nature.

The Hermit Thrush has a reddish brown tail much brighter than the back and head, and a breast quite heavily spotted with black. When migrating it does not sing;

but in its summer home in the woods, where it finds seclusion, it pours forth a song which in purity and sweetness of tone, and in exquisite modulation, touches the very highest chords of bird music. The Olive-backed Thrush, Bicknell's Thrush and other species are summer residents up into Canada, and are quite similar to those described.

THE AMERICAN ROBIN, BEST KNOWN OF THE THRUSHES

The best-known and most-loved of all the thrushes is the American Robin, which is abundant about farms and dwellings over Eastern North America. His loud, cheery carol, *cheerily-cheerup, cheerily-cheerup*, repeated many times, is welcomed in the early spring, and tells us that the winter is past.

The robin is about ten inches long, much larger than the little robin red-breast of England, which is not a thrush. The male has a black head, a reddish brown breast, and drab upper parts. The female has duller colors. The nest is of coarse grasses and rootlets, with an inner wall of mud and lining of fine grasses, and may be found in shade trees or on a veranda beam. She lays from three to five greenish blue eggs about one inch long. The young are fed on larvæ, chiefly cutworms, and in this way robins do a good work. It is true they may help themselves to cherries and strawberries from the farmer's garden, but otherwise they do little damage, and none would wish to miss their cheery songs.

The Robin in the cherry tree
Is blithe as any bird can be;
And bubbling from his silver throat
His wordless songs of rapture float—
O happy, happy May.

Few birds are more friendly toward man. They seem to feel that no one could possibly wish to hurt them. Unfortunately this confidence is often misplaced. Thousands are shot or trapped while migrating, but as they raise more than one brood every year, they are still comparatively plentiful.

Though robins seem to go south in winter, it is not uncommon to find them winter residents in New England or southern Canada. It is believed that these are the birds which breed in the Far North, and grow tired after they have traveled several hundred miles southward. Meanwhile those which breed in New England have gone farther south, and those which

were hatched in the southern states go to the tropics.

The Bluebird is another thrush which makes itself at home in our orchards and gardens, and occupies the cozy birdhouse in the apple tree. "The robin, the fore-runner of the spring, the bluebird with his jocund caroling." Twenty years ago the bluebird was one of the most abundant of our summer residents, but now it is not common. Just why, we cannot say. It may be it goes to more northern unsettled districts, where it can still find "snake" fences and stumps in the pastures. It is cobalt-blue above, cinnamon-red below, with a white belly. Its disposition is typical of all that is sweet and amiable.

It is an expert catcher of insects, and a pair will destroy thousands in a season. They raise two, and even three, broods, and the appetites of the youngsters are enormous. It pays a farmer to prepare boxes in which they may nest and start housekeeping without delay. Pairs have been known to use the same nesting-place for several years in succession.

THE WOOD WARBLERS FOUND ONLY IN AMERICA

We close this review of birds of the Northern province with a reference to the wood warblers, which are found only in America; and of the one hundred species known, about thirty go as far north as Canada. With few exceptions they are inhabitants of the woods, but may be found in the trees of lawns and orchards. They are among the last of the spring arrivals, and the first to leave in autumn on their way to Central and South America. Like the flycatchers, their food is chiefly insects. Some look for these on leaves or bark, while some capture a large part of their food on the wing. All are small. Many are among our brightest-colored and most interesting birds. None of them is remarkable as a songster. All through the summer they are actively engaged in exterminating the hosts of our smaller insect enemies, and many thousands of broods of caterpillars are destroyed by them before they are large enough to do mischief.

The Redstart is perhaps the most brilliantly colored of all the warblers, resembling the Baltimore oriole, except in size. The Blackburnian Warbler is black, white and chestnut. The Yellow-breasted Chat is an excellent mimic, and there are a dozen others we might name.

TWO OF THE MORE INTERESTING WOOD WARBLERS

The Yellow Warbler, or Summer Yellowbird, is the most familiar of all because of its canary-like plumage and because it nests in the trees and shrubbery about the home. The upper parts are bright greenish yellow; the under parts are bright yellow, streaked with brown. The female is uniformly yellowish olive-green. Its nest of fine grasses and fibres is lined with down. The tiny eggs are bluish white, thickly marked with brown. Its bright colors, and its pleasing, though simple, song—a happy *wee-chee, chee, chee, cher-wee*—add to the attractions of the rural home.

This bird seems to suffer more than others from the attentions of the cowbird. Sometimes when this warbler finds the unwelcome eggs of the cowbird in its nest it has been seen to build another nest on top of the old.

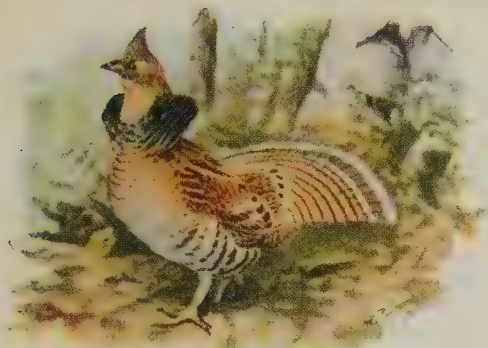
One of the commonest and the most interesting of the woodland warblers is the Ovenbird. The crown is orange-brown, bordered by black; the upper parts olive-green; the under parts white; with the sides of the throat, breast and sides streaked with black. Flying up from the ground, he cautiously hops from branch to branch, walks carefully along a limb, and then suddenly "bursts forth into a wild outpouring of intricate and melodious song" which vibrates through the woods, as in rising tones it seems to say *teacher, teacher, teacher*.

THE MANY WATER BIRDS SEEN IN THE NORTH

You have noticed that we have spoken only of land birds in this story. This is not because water birds are not both numerous and important in the Northern province. In fact, they are probably more common in this section than elsewhere. One reason we have not mentioned them is that they are generally so large that they attract attention, and therefore are better known than many of the smaller land birds. We have not neglected them, however. In Volume Eleven you will find three chapters on the water birds of the world, and in those chapters you will find mention of the swans, geese, ducks, herons, cranes, gulls and other birds which love the water. Among our colored plates in other volumes you will also find them pictured.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 5017.

SOME INTERESTING AMERICAN BIRDS



RUFFED GROUSE



BLUE JAY



YELLOW-BELLIED SAPSUCKER



QUAIL, OR BOBWHITE



UPLAND PLOVER



ROSE-BREASTED GROSBEEK

Here are some common birds of the fields and woods. The ruffed grouse and the quail are game birds. The jay is noisy and quarrelsome. You can hear the sapsucker tapping on the trees. The rose-breasted grosbeak is rather shy, but may often be heard singing at night.

SOME COMMON BIRDS OF FARM AND WOOD



YELLOW-BILLED CUCKOO



LOGGERHEAD SHRIKE



BLUEBIRD



ROBIN



BARN SWALLOW

These birds are found in the United States and Canada. In fact, many birds of Canada and the United States are the same, though Arctic birds do not venture down into the United States, and some tropical birds do not visit Canada. The robin, the bluebird and the barn swallow are common. The cuckoo winters in the South, and the cruel shrikes are the dread of the smaller birds.

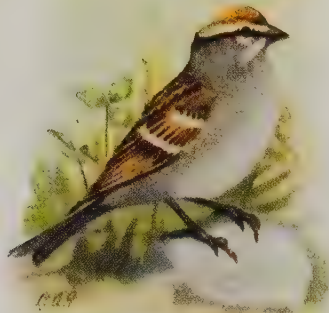
WELL-KNOWN BIRDS OF NIGHT AND DAY



KINGBIRD



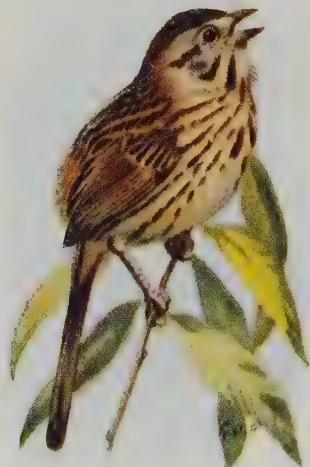
NIGHTHAWK



CHIPPING SPARROW



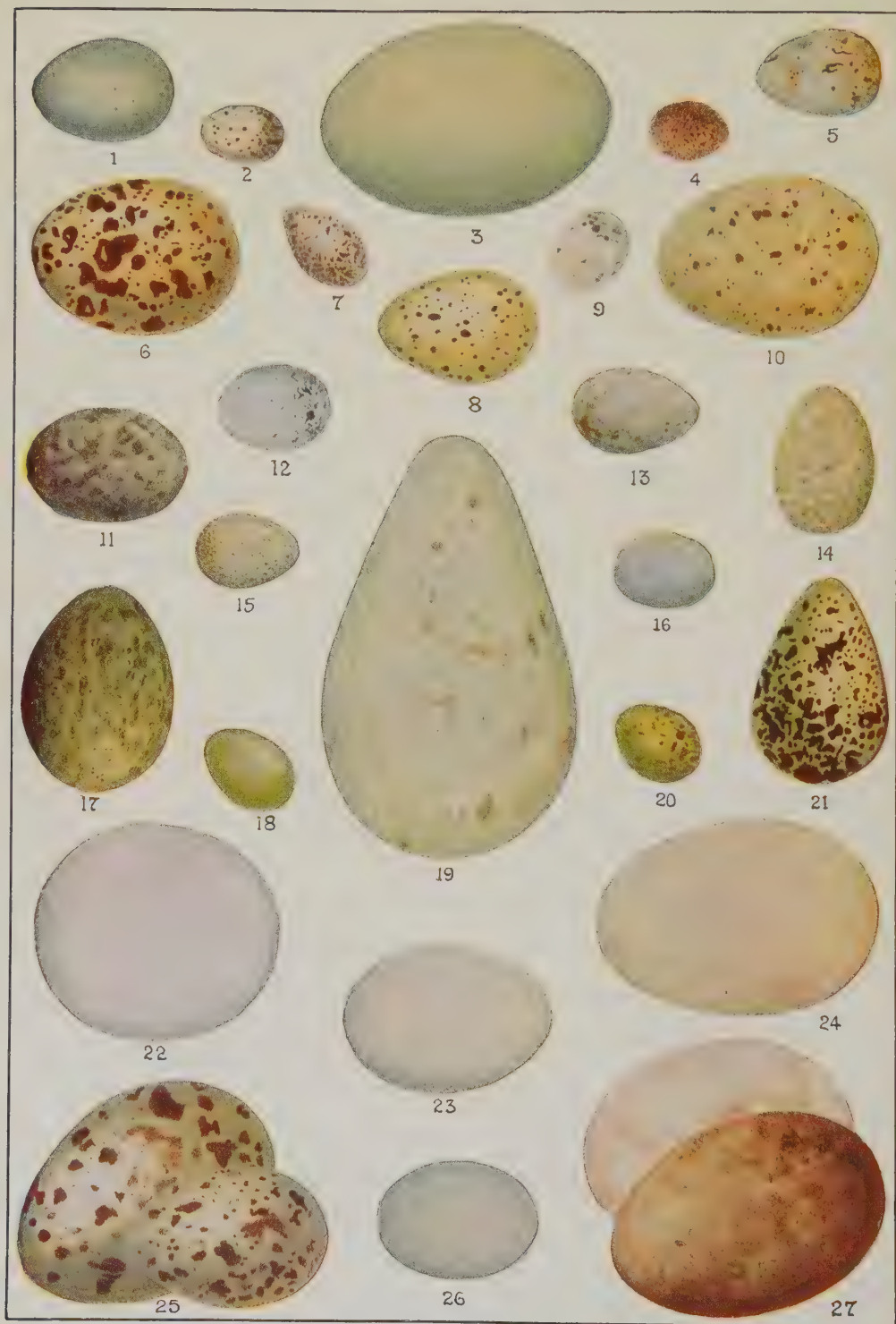
BROWN THRASHER



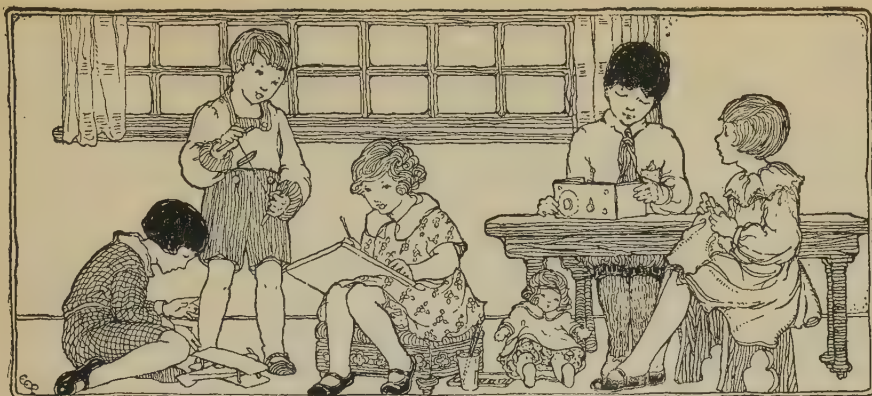
SONG SPARROW

Some sparrows are sweet singers, destroy many injurious seeds and insects, and have beautiful manners. They are not like the rude English sparrow, which has become a nuisance. The chipping sparrow and the song sparrow range over the greater part of North America. There are many other kinds of sparrows. The brown thrasher is a delightful songster, while the kingbird is a sturdy fighter for his rights. The nighthawk eats many insects.

CHARACTERISTIC EGGS OF AMERICAN BIRDS



1. Jays. 2. Titmouses. 3. Egrets and Herons. 4. Wrens. 5. Orioles and Blackbirds. 6. Grouse or Partridges. 7. Swallows. 8. Woodcock. 9. Pewee Flycatchers. 10. Gallinules, Coots and Mudhens. 11. Whip-poor-will; Nighthawks. 12. Towhee Finch. 13. Vireos. 14. Brown Thrasher. 15. Cowbird. 16. Bluebird. 17. Crows, Ravens, etc. 18. Thrush. 19. Guillemots and Auks. 20. Sparrows. 21. Plovers. 22. Owls. 23. Grebes. 24. Scaup-duck. 25. Gulls and Terns. 26. Cuckoos. 27. Hawks and Falcons.



HOW TO MAKE CUT-PAPER COMPOSITIONS

IT is sometimes said that cut-paper pictures look much like Japanese art. This is probably due to their simplicity as well as to the flat tones of the paper. The masters of Japanese art leave the filling-out of the picture to your own imagination, and so it is with cut-paper, especially if the subject happens to be a landscape. The dominating thought is presented and the details are merely suggested, as shown in the accompanying cut-paper compositions.

The medium itself is not so important as is the way in which it is used. The materials, whether simple or complex, are not of so much consequence as are the fine choices and creative thought which give the product art quality. Cut-paper, when used with well-chosen color and arrangement, offers many opportunities for experiences in composition and design. Even kindergarten children can use it with the utmost freedom, and often they make small bits of art which surprise themselves as well as adults.

Many children see things first as a whole, and cut-paper serves to show these masses in a large and simple way. They are inter-

CONTINUED FROM 4738

ested in masses of sky, sea or river, grass or trees, houses or boats, and other objects which enter into their daily lives. Any child after a day in the country, a morning by the sea,

or a trip through the country, town or city, can freely express his individual experiences with scissors and paper. Choices as to light and dark color, size, shape, placing and arrangement should be left to his creative mind. Beginning at this early age, little children enjoy expressing themselves in simple but fine ways at first, while older boys and girls can make more difficult and expressive compositions.

There are many ways of using cut-paper. It comes in hundreds of lovely tones and varied textures which suggest possibilities for all-over patterns, rhythmic borders, flower designs and quaint landscapes, and it is

quite inexpensive. If local dealers do not have what you wish, wholesale paper houses and supply stores will furnish the materials by mail.

In starting to make a cut-paper composition like those shown in the illustrations you should think first of the shape in which



Cut-paper composition of a story.

you intend to place it. Then choose a color-scheme. It might be a green-blue sky, dark blue-green trees, yellow-green grass, dull white and dingy houses with orange-red roofs and chimneys and blue-green window shutters. This, with dull yellow for the roads and touches of the orange-red for the flowers by the roadside, and darker shades here and there would complete the color-scheme.

The composition, if simple, may be cut free hand, or, if more complex, it may be first sketched lightly with pencil on the back-ground. It is easier, as a rule, to cut the sky or foreground the size of the entire picture and then arrange your shapes on this. Cut the principal masses first, then the subordinate ones, and move them about until the composition is good. This moving-about of the cut-out shapes is

most interesting because so many changes and varied arrangements can be made in a short time. When you have made the best possible grouping, it is time to paste. Use a pointed stick for this purpose and a heavy flatiron to insure a perfectly flat surface.

Cut-paper may be used in many ways. It furnishes a splendid means for designing posters, festival cards, covers for portfolios, and the like. It is charming when combined with cardboard construction work. Boxes, baskets, desk sets and other things may be designed with patterns,



Cut-paper composition of a street scene.

rhythmic borders or flower designs.

After experimenting a little with this delightful material you will discover additional possibilities, and the work will be truly an artistic experience for you when you are able to create a harmony by means of shapes and color.

A BOX THAT MAKES SMOKE RINGS

WE have all seen those rings of smoke which some smokers can throw out of their mouths, and which have, perhaps, made us wonder. While we do not want to blow smoke rings from our mouths, it will be very interesting and instructive if we can make an apparatus that will blow out the rings for us. Such a toy is of scientific value, and can be made quite easily by any boy or girl. It is called a vortex box, the word *vortex* meaning "whirlpool" or "whirlwind."

First of all we must get a square wooden box, such as those cases which hold four or five pounds of tea. Then we remove the lid altogether, and in the opposite side we cut out a circular piece about 3 inches in diameter. We can do this by first drawing a circle. In this we bore a hole with a tool or red-hot poker, then insert a saw and cut out the circle we have drawn.

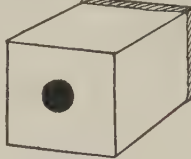
Now we take a piece of stout canvas a little larger than the box lid and nail it over the opening in place of the lid. We glue down all round the flap that is left by the canvas being

too large for the square opening. All that we now have to do to get our rings of smoke is to fill the box with smoke and tap smartly on the stretched canvas, when the rings will follow one another in rapid succession.

There is a way of getting a very white smoke by having openings in the side of the box, and through these placing glass tubes connected with flasks containing chemicals. The chemicals are heated, gases enter the box from the flasks, and as they combine there a white smoke is formed. But we had better not attempt such a difficult process, as it is quite simple to fill the box with smoke. We can burn coarse brown paper in the box, and as it

smolders a thick smoke will be formed that will serve our purpose quite well. It is possible to buy from a dealer in fireworks a powder that will give off a dense red smoke when it is burning. This is effective.

The box can be made more amusing by painting a man's face on the side where the round hole is, letting the hole represent the mouth.



The vortex box.

A CHEAP WAY OF BEING GENEROUS

TAKE a little common white or beeswax, and stick it on your thumb. Then, speaking to a bystander, you show him a dime, and tell him you will put the same into his hand; press it down upon the palm of his hand with your waxed thumb, talking to him the while, and looking him in the face. Suddenly take away your

thumb, and the coin will adhere to it; then close his hand, and he will be under the impression that he holds the dime, as the sensation caused by the pressing still remains. You may tell him he is at liberty to keep the dime; but on opening his hand to look at it he will find, to his astonishment, that it is gone.

FRACTURES, DISLOCATIONS AND SPRAINS

A FOURTH LESSON IN FIRST AID TO THE INJURED

CONTINUED FROM PAGE 4733

A FRACTURE of the skull should always be regarded as a serious matter by those who render first aid, owing to the possibility of the brain being injured. The upper part of the skull is usually fractured by direct violence, as by a blow on the head, or by the head striking the ground or some hard object during a fall. X-ray examination is usually necessary.

Fractures of the base of the skull are caused indirectly by a fall upon the head or feet or lower part of the spine, or by a blow upon the lower jaw. The signs of a fracture of the base are unconsciousness and the issue of blood from the ears or nose. In such a case it is essential that medical aid be obtained at once, but in lifting the injured person and carrying him the greatest care must be taken to support the head, and by means of a well-arranged coat, used as a pillow, to prevent it from rolling about from side to side.

When the upper part of the skull is fractured, there is frequently considerable swelling, and, sometimes, a wound allowing the bone to be seen. If the injury is a bad one, unconsciousness will come on more or less rapidly, and if it is very bad the unconsciousness will be immediate. In all cases of injury to the skull resulting in unconsciousness the patient should be kept thoroughly warm, any flow of blood should be stopped, tight clothing should be gently loosened, the free access of fresh air should be secured, and no food or fluids should be given while unconsciousness continues. When consciousness returns, water may be given, and the patient must be warned against any movement.

When the lower jaw is fractured, there is great pain, the patient's mouth remains open, he is unable to speak or move the jaw, the teeth are uneven, and there is bleeding from the gums. In such a case, with the palm of the hand raise the lower jaw into position, place the centre of a narrow bandage under the chin, take one end over the top of the head, and cross the two ends at the angle of the jaw, as shown in picture 1. Then carry the long end round the chin, and tie the two ends of the bandage at the side of the face; or, if no bandage is available, two handkerchiefs may be used, as in picture 2.

A fall on the hand or arm very often breaks the collar-bone, and the result is inability to raise the arm above the shoulder and a leaning of the head to the injured side. This is a common accident on the football field. The broken ends of the bone can usually be felt overlapping. To render aid in this accident, remove the patient's coat, make a large soft pad, and place it in the armpit; then, while

the shoulder is kept well back the forearm should be bent up and supported in a sling. To make the sling for a fractured collar-bone we take an open triangular bandage, and, placing one end over the uninjured shoulder, let the bandage hang down in front over the injured arm, with the point reaching beyond the elbow. The lower end of the bandage is now passed under the arm, across the back, and the two ends are tied on the sound shoulder.

The point is folded over the elbow of the injured limb and pinned down as in picture 3, another bandage, folded broad, being tied fairly tightly round the body and elbow as shown.

Sometimes a person is so unfortunate as to break both his collar-bones at one time. In this case a narrow bandage should be tied round each arm, as shown in picture 4, and the ends passed across the back and round the body, and then tied together in front, as in picture 5. Before the bandages are tied in front the two forearms should be raised, with the hands rather higher than

the elbows, and they should be supported in the bandage. The purpose of the bandages tied to the arms just below the shoulders is to keep the shoulders well back. This gives relief to the patient and prevents the broken bones from doing any damage.

In a case of fractured shoulder we place a broad bandage under the armpit of the injured side, carry the ends over the sound shoulder, and, taking them round, tie under the sound armpit. Then we support the limb in a sling.

A fracture of the spine is very serious, and often causes instant death. If the patient lives, he must be lifted very carefully and without the slightest jolt on to a stretcher, covered with garments to keep him warm, and a doctor summoned immediately.

When the ribs are fractured, the patient is unable to breathe properly or to cough, owing to great pain, and if the hand be placed over the injured place and a deep breath is taken, a grating of the broken bone or bones will be felt. The ribs most generally broken are the sixth, seventh, eighth and ninth, and the fracture is usually about midway between the breastbone and the spine. Fracture of the lower ribs on the right side may injure the liver, and cause blood to be coughed up. If the fracture is a simple one and no internal organs are injured, the treatment is to place a triangular bandage, folded broad, round the body, and tie it on the sound side. It is even better to fasten two bandages in this way, one above the other and overlapping. If triangular bandages are not avail-



1. How to bandage a fractured jaw.



2. Handkerchiefs used as bandages for the face.

able, a folded towel may be used, and fastened with safety-pins. The arm on the injured side should be put in a large sling. If a roller bandage can be obtained, it is even better than the triangular, and when rolled round the chest, from below upward, gives great ease and comfort to the patient.

When the breastbone is broken, all tight clothing must be loosened, and the patient kept warm and quiet, in as comfortable a position as possible, until a doctor arrives to set it.

One other kind of fracture must be mentioned, although it is rarer than the others that have been referred to—that is, a fracture of the pelvis. The patient will be quite unable to stand, and will not be able to move the lower limbs without intense pain. The danger of injury to internal organs is great, and the patient must be laid in a comfortable position, and have a broad bandage tied round the hips sufficiently tightly to give support without pressing the broken bone against the organs. If the injured person is moved, he must be lifted upon the stretcher with the greatest care, but it is better to bring the doctor to him than to take him to the doctor. Even when no bones are broken a person may suffer a dislocation—that is, two or more bones may get out of place. Dislocations of the lower jaw, the shoulder, elbow and fingers are by no means uncommon. There is great pain near the joint, with loss of power in the limb, and frequently swelling of the joint, which sometimes becomes fixed. Only a qualified doctor should attempt to replace the bones, but we can help the patient by supporting the limb on pillows or coats, by very gently applying cold-water dressings to the injured joint, and by following these with hot-water dressings.

Another quite common injury is a sprain. This is frequently caused by a sudden jerk or wrench, which causes the ligaments round a joint to become stretched, or sometimes even torn. There is a great deal of pain at the joint, with swelling and much discoloration.

The ankle is the joint most frequently sprained. If the injury occurs out of doors, a bandage should be bound over the shoe. Place the bandage under the foot, bring the ends over the instep, and then bind round and round the ankle, fixing it firmly. If the bandage be moistened after it is tied in position, it will tighten and become more effective. This outside bandage will enable the patient to move more easily to a shelter. The shoe and stocking should then be removed in the proper first-aid manner, and cold-water dressings should be applied to the joint, which must be placed in a comfortable position. If the cold water does not give relief, hot-water

dressings may be used. This treatment is for a sprained ankle; sprains of the other joints may be treated in the same way as dislocations, as described above.

Strained and torn muscles are not uncommon. They cause much pain and weakness. The patient should rest in as easy a position as possible, and heat—applied either by hot-water bottles or hot-water dressings—will relieve the pain.

Very often a fall or a blow that is not sufficiently severe to cause a fracture may give rise to hemorrhage, or bleeding underneath the skin, without breaking the skin. This is called a bruise, and if it is a severe one, may cause much pain and great swelling and discoloring of the skin. A "black eye" is a familiar example of a bruise. The best treatment is to apply cold-water dressings to the place; or, better still, if ice is available, the ice should be applied.

Before closing the lessons that deal with fractures and their treatment, there are one or two points upon which too much stress cannot be laid. When the accident has happened, no attempt whatever must be made to remove the patient until the broken limb has been bandaged with a splint, so that the bone is fixed and the broken ends are unable to do any further damage to the flesh or blood-vessels near them. To some of us it may seem only a small thing to move a patient from the roadway to safety on the pavement, or from the actual football ground to a place somewhere at the side, but such movement before the limb is bandaged with splints would be most serious

and very painful, and might even be disastrous. Then, while the bandages and splints are being prepared, the broken limb must always be supported and kept perfectly still, and, lastly, if the leg should be injured, it must always be straightened very carefully by pulling before the bandages are finally tied.

It is well to go over once more the difference in the kinds of fractures. A simple fracture is one in which the bone is broken but the skin shows no wound. In the compound fracture the break in the bone is accompanied by a wound. Careless handling may convert a simple fracture into a compound one, as a broken bone usually has sharp edges and a little movement may put these through the soft surrounding flesh. This is a warning that needs constant repetition, for it is a terrible thing to do harm where we try to do good. In a simple fracture there is no chance of germs getting into the break; but if the fracture is compound, the wound may become infected. It should not be touched with the hands.

The next lesson in first aid is on page 5000.



3. Method of bandaging for a broken collar-bone.



4. How to bandage when both collar-bones are broken, back view.



5. Front view, showing how ends of bandages are tied.

MAKING A SUMMERHOUSE

A GARDEN summerhouse may seem to be far beyond the skill of the boy carpenter, but it is not difficult at all. Size does not mean difficulty. Indeed, the garden summerhouse, which we shall see how to make in this article, is really much simpler to construct than many of the things that are smaller. It will be suitable for any situation, but if it is to be placed in a corner or against a wall, the sides that face the wall or walls need not be finished so carefully as the front and those sides that will be exposed to view. We require, first of all, seven wooden posts 8 feet long and 3 inches square. First we chamfer two edges of each post from top to bottom. By chamfering is meant to cut or shave off a corner. Picture 1 on the next page shows a small piece of wood that has been marked for chamfering. The shaded corners show the wood that must be cut away, and to the right of it, in picture 2, we see how the post will look when chamfered, if viewed from the top or from the end. We chamfer the four corner posts on three edges and the others on two edges only. The chamfered edges serve no purpose except to improve the appearance. The next thing we do with our posts is to cut away one end of each to a point, as in picture 3. The easiest way to do this is to make a pencil-line on all four sides of the post about 4 inches from the bottom. Then on each side we draw with a pencil two lines from the end of the pencil-line to a point right at the end of the post and midway in its width, as seen in picture 3. Now we take our saw—a cross-cut saw is best—and saw right through from the sloping line on one side to the corresponding mark on the opposite side. We should begin the sawing from the side of the post, not from the bottom. When we have sawn four pieces from the post in this way, it will be pointed as seen in picture 4. All the posts should be treated in this way, after which they are ready to be driven into the ground.

The ground upon which our summerhouse is going to stand should be level. If it is not level, we should make it level with a spade. Now we measure off the distances so as to find the points where our posts should be driven in. We drive in three posts for the back

and four for the front. Picture 5 shows the distances between the posts, and therefore the distances that should be measured off. We can see the way in which the seven posts have to be arranged. The single post in the middle of the back is to give additional strength, and the two middle posts in the front will do for door-posts.

To drive in the posts, one of us holds a post with its point on the ground at the proper spot, while the other, standing on a stepladder or a big box placed for the purpose, strikes the top with a heavy coal-hammer. As it is desirable not to injure the post that is driven in, it may be well to hold another piece of wood on the top of the post being struck, so that it may receive the force of the blow. The posts should be driven into the ground about

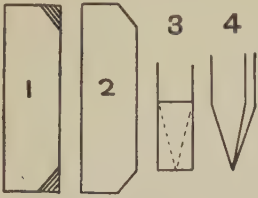
2 feet, and it is important that they should all be the same height. We can see if the tops of the posts are level by putting a plank across from one to another and testing it with a carpenter's level. We can tell if the posts are upright by tying a small weight to a piece of string and allowing it to hang down from one edge of the side of the posts. If the lines made by the string and the side of the post are parallel, we know the post has been driven in straight, and we may then proceed with the next part of the work.



The garden summerhouse when completed.

Picture 6 on page 4850 shows this frame at a later stage in the work. Here we have some boards about 8 inches wide nailed along the bottom and along the top, and we have also horizontal ribs put in about midway in the height between the upright posts. The top and bottom boards are easily put in. It may require a little care in fitting the ends, but we shall be able to find the proper way to do it as we proceed. But the horizontal stays require some explanation. They should be made of the same size of wood as the posts, 3 inches square, and the two front edges should be chamfered like the posts. Then both ends of each horizontal stay should be cut in the manner shown in picture 7. This is called checking. The thin piece sticking out at each end is nailed to the upright post. An even stronger way of making these horizontal pieces is to cut them to a bevel, as illustrated in picture 8,

and to cut out the upright posts to fit this bevel, thereafter putting two nails in from the back of the stay. This gives a little more

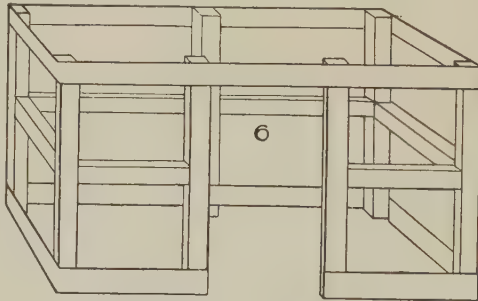


1 and 2. A board marked and cut. 3 and 4. A post marked and pointed.

work, but it is much the stronger method, and there will not be so much difficulty in fitting the ends of the stays where one stay touches another. So we should adopt this method.

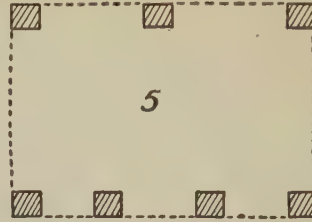
Our summerhouse is still without a roof. We

shall give it a roof of some ornamental form. We take four posts 3 inches square and cut them to the same length as the back and front and sides of our house. Then we must lay these pieces on the top of the upright posts and nail them, taking care to unite them carefully at the corners. Then we take a similar piece of wood and fix its bottom end to the middle of the top rail in front, and another piece to the middle of the top rail at the back. These two pieces should be of equal length, anything from 12 to 18 inches. To the top of these again we nail a three-cornered piece right across from front to back. The skeleton of the roof as we have described it is seen in picture 9. Now let us nail on flat boards from the top, or apex, of the roof to the sides, allowing them to project at each side about 6 inches. Now we nail flat boards up the back, inside the summerhouse,



6. The framework of the summerhouse.

very pleasing effect. The upper half may be fitted with trellis-work, as in the picture on page 4849. Now we can paint the whole wood-



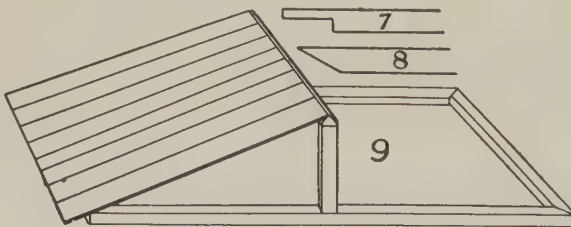
5. How the posts should be placed.

work a soft green color, giving it no fewer than two coats of paint, and three for preference. The roof should be covered with light roofing felt, which can be

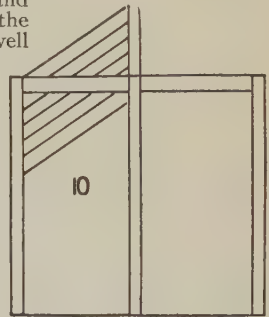
purchased at any large hardware store, and which should finally be given a coat of tar and sprinkled over with sand.

Our summerhouse is now without seat or floor. We shall remedy these omissions. The earth floor should be beaten down hard and level. The best thing to do then is to make two wooden mats which, together, cover the entire floor. Three shorter posts should be driven in to carry the seat, then a front and back rail should be nailed on, and, finally, the slots for the seat will make it complete. If we like, we can fill in the openings or window-spaces with trellis-work, which may also be painted green. We shall then have a strong, serviceable and artistic summerhouse. The inside of the sum-

merhouse may be varnished, and the inside of the roof will look well



7. A post checked. 8. A post beveled. 9. The way to make the roof.



10. Boarding back of the house.

putting them on slanting as seen in picture 10, and inclosing the back entirely. We treat the lower portion of each side and the front, excepting the doorway, in the same way, but we may put a slight chamfer on each board, giving a

if painted in stone-color. A rustic table and white tablecloth may be added to complete the comfort of the summerhouse, and curtains and ferns will help to decorate the interior, while the floor may be covered with linoleum.

THE MARVELOUS EGG

PLACE two wine-glasses touching each other and in a direct line from you. In the one nearer to you place an egg with its smaller end downward. Then blow with the mouth sud-

denly and sharply and strongly against the side of the egg, but in a downward direction. The egg will be lifted up and, falling over, will lodge in the other glass.

HOW TO KNIT A CHILD'S SOCK

ANYONE who wishes to knit a sock should first practice plain knitting with the knitting-needles. These are, at first, more trouble to handle than a crochet-hook, until one gets accustomed to them; but after some practice the work can be rapidly done, so that many knitters hardly notice what their fingers are about, and can read while working. The stitches are formed on a long eyeless needle held in the left hand, regulated by the thumb and first finger, the other fingers steadying the needle. The right hand holds the second needle with the wool placed under the little finger, over the top of the third finger, under the middle one and over the first. In this way the supply of wool to the right needle is controlled. Picture 4, on the next page, shows exactly how the needles should be held.

A pair of socks for a child of about

the age of three, if knitted in the way described here, would use up $2\frac{1}{2}$ ounces of Andalusian wool or rather fine yarn. A sock can be knitted on four standard steel knitting-needles, size 16.

A start is made with the leg of the sock, beginning at the top by casting 29 stitches on a needle held in the left hand, with the fingers inclosing the needle, after tying on to it a loop at the end of the wool. Casting on is done by taking another needle, putting it into the loop, bringing the wool forward and drawing it through the loop which is on the needle in the left hand, then placing this loop over the point of the needle in the left hand, as shown in picture 5. It is very important that the wool is not drawn tight, or the stitches will be too close together and difficult to knit.

When all the 29 stitches are on the first needle, the second one is used and 24 stitches are cast on that, without, of course, breaking the wool; then the same is done with the third needle. There are now three needles forming a triangle, and holding altogether 77 stitches.

Knitting, or, to give it its correct name, plain knitting, is done in the following way: We insert the point of the right needle through the stitch on the left needle so that it comes out on the other side of it. Then, with the first finger of the right hand, the wool is looped over the point of the needle in the right hand, drawn through the stitch, and the left needle withdrawn. This sounds very

complicated, but plain knitting is really easy when we hold the needles properly. We are really making a stitch on the right

needle before withdrawing the left one. We must look very carefully at picture 1. After taking another stitch like the first one, we make quite a different one, called a "purl" stitch. Purling is done by bringing the wool in front of the right needle, putting this through the front part of the stitch on the left needle, then twisting the wool round the right needle, passing it through the loop, and lastly withdrawing the left needle. It is really knitting on the reverse side. Now let us look at picture 2. We

take another purl stitch and then repeat the 2 plain stitches and the 2 purl three times; next we knit 2 plain stitches and 1 purl. This last purl stitch is going to make the seam stitch down the back of the sock, so

we distinguish it by tying a little piece of white cotton on to it. We now continue knitting 2 plain and purling 2, or, as it is briefly put, knit 2 and purl 2, to the end of the needful. Then we knit 2 and purl 2 till the stitches on the second and third needles are off.

If we look at the sock in picture 3 on this page, we see that the upper part of the leg is different from the rest. It is what we call ribbed, or welted, to prevent the sock slipping down the leg. The furrows beside a rib are caused by the purl stitches.

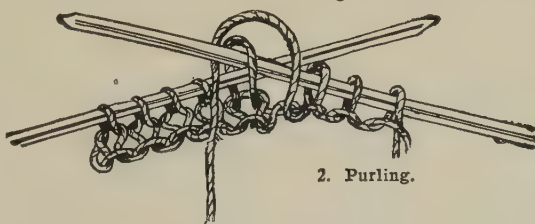
We need twenty-three more rounds like the first one, and when these are done we knit sixteen plain ones, but always purling the seam stitch when we come to it.

By this time we must think of decreasing our stitches, because the leg gets smaller toward the ankle. So in the next round we knit plain until we reach the third stitch before the seam stitch, and then knit 2 together. To do this we put the needle through 2 stitches and knit them as though they were

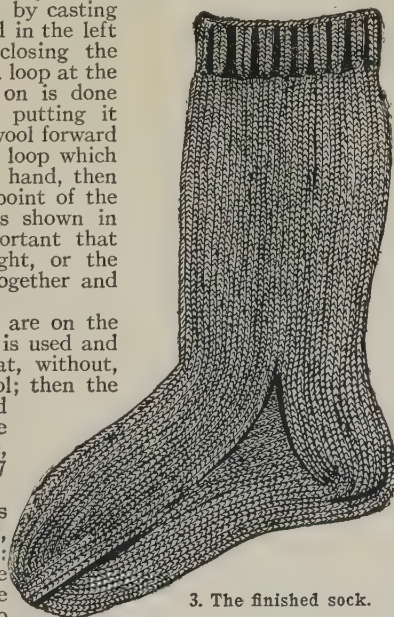
one. Then we knit 1 and arrive at the seam stitch, which we purl. After that we decrease in another way by knitting 1, "slipping" 1—done by lifting the stitch on to the right needle—knitting 1, and with the left needle



1. Plain knitting.



2. Purling.



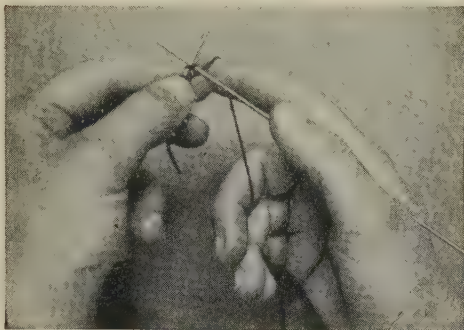
3. The finished sock.

drawing the slipped stitch over the one just knitted. The round is finished plain. The next five rounds are plain, and the sixth is like the one described above, which decreases.

These six rounds are repeated four times, and by then we have only 17 stitches on the first needle, the odd one in the middle being the seam stitch, while there are still 24 on each of the other two needles.

The leg of the sock is finished with twenty more plain rounds.

It is now time to start the heel of the sock. This we do by knitting 8, purling the seam stitch, knitting 8, and then knitting 8 on the second needle. We now turn the work and go back again, slipping the first stitch and purling 15 till we are back at the seam stitch again. This we knit plain; then purl the next 16. There are now 33 stitches on one needle; they are called heel stitches, and, leaving the other 32 to form the instep later, we turn our attention to these heel stitches, knitting one row and purling one row till we have twenty-eight rows, and taking care to slip the first stitch, but retain the seam stitch.



4. The correct way to hold the knitting needles.

Now for the heel we slip the first stitch, knit 6, make 1—that is, make 2 stitches on the same stitch, 1 on the front and 1 on the back of it—knit 2 stitches together, knit 4, again knit 2 together, and then knit 1.

We are now at the seam stitch, and, after purling it, we continue to knit 1, slip 1, knit 1, draw the slipped stitch over, knit 4, slip 1, knit 1, and draw the slipped stitch over. It is now necessary to turn again, so we make 1, and purl to the ninth stitch after the seam stitch. The next time of turning we proceed as above from “make 1” and continue till all these side stitches are knitted, but in the last turn omit the first stitch before purling.

We should now have 15 stitches for the top of the heel. We knit 15 plain from them, and take up and knit on the same needle 15 stitches that are on the side of this piece.

Next we can return to the 32 instep stitches and knit them plain on to one needle. The 15 stitches on the other side of the heel are also taken up, and 7 stitches knitted on to the top of the heel.

If we count our stitches correctly, we shall now find that we have 77, the number with which we started on the three needles.

To make the gussets at the sides, we start with the first of the two foot needles by knitting 1, slipping 1, knitting 1, and drawing

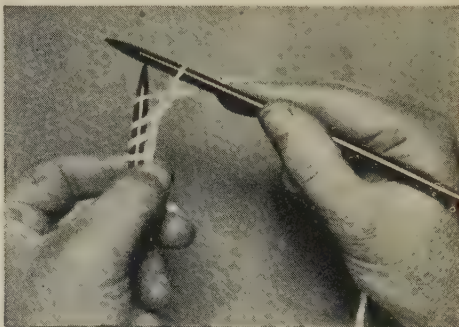
the slipped stitch over. That is to decrease; then we knit plain to the third stitch from the end of the second foot needle, and dispose of these by knitting 2 together and knitting 1. There is still the instep needle, which we knit plain, and follow that by knitting two rounds.

This knitting for the gussets we repeat till the round consists of 65 stitches, 33 stitches on two of the needles, and 32 instep ones on the third. After knitting thirty rounds we give our attention to the toe of the sock.

The toe is naturally obtained by decreasing. We knit 3, slip 1, knit 1, draw the slipped stitch over, knit till we reach the fifth stitch from the end of the second foot needle, and finish by knitting 2 together, and then knitting 3.

There is now the instep needle. This we dispose of by knitting 3, slipping 1, knitting 1, drawing the slipped stitch over, and at the fifth stitch from the end knitting 2 together and then knitting 3. Two plain rounds follow.

These toe rounds are repeated three times, but then a decrease round alternates with a



5. The method of casting on the stitches.

plain round until only 25 toe stitches remain. The 13 foot stitches are now transferred to one needle, which is placed alongside the instep needle, and 2 stitches knitted through together; but as there is an odd central stitch on one needle we dispose of that by knitting 3 together. We make the last loop large enough to pass the ball of wool through it, draw the wool tight and cut it about 1 inch from the sock. That finishes the sock, which should now look like that shown in picture 3 on the previous page.

Hand-made socks and stockings not only are warmer than the machine-made ones, but they wear better and last much longer, so that they are always in demand. Those of us who are beginning to think of Christmas presents will find that a pair of stockings is a very acceptable gift to either the golfer or the cyclist. As far as the actual number of stitches is concerned, of course, the instructions given above will be useless; but, having once grasped the idea, we shall find that we have no difficulty in carrying out any pattern which we may fancy to copy. Nowadays, golf stockings of many colors are popular. The designs are found in plaids or some arrangement of square or diamond-shaped figures. These stockings are not difficult to make.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 4997.

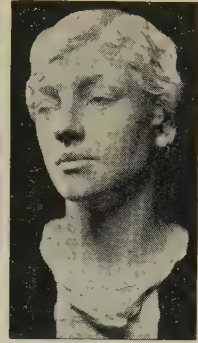
The Story of THE FINE ARTS



Evelyn,
By Sir W. Goscombe John.



The Potter,
By F. W. Pomeroy.



Sylvia,
By C. L. Hartwell.

BRITAIN, AND LATER EUROPE

MANY centuries elapsed between the sculpture of the Gothic cathedrals of England and the rise of a school of free sculpture. The story of the Gothic buildings you will find on page 5963.

Of the carving done in those early days a great part was wrought into the actual building; the sculpture was done after the stones were built into the walls. In any of the Gothic cathedrals, such as Peterborough, Lincoln, Salisbury, Exeter, Wells, we can see beautiful sculpture which was part of the architect's thought. And the Gothic law dominated architecture so completely—the law that sculpture must follow the lines of the scheme of the building—that free sculpture was of a very slow growth indeed.

It first took the form of heads of angels and saints—of which, after all the changes of time, there are thousands left “to joy us,” as the old writers would say. There are also a great number of single figures, like the lovely pillared Madonna of the Chapter House in York, and those on Henry V's chantry in Westminster Abbey.

This Gothic sculpture passed through various phases. There was the time when Purbeck marble, a hard tinted shell-limestone quarried in Dorset, was in great demand. A peculiar quality



in this stone gave an unusual texture to the carvings, and it also admitted of a polish. A number of churches and cathedrals still treasure specimens of the work of the Purbeck marble men. There is a great deal in the Temple Church and in Westminster Abbey.

Then, somewhere about the year 1300, the fashion of Purbeck marble died out, and sculptors began to work in wood, bronze and alabaster, as well as stone. The carver in alabaster took the place of the worker in marble, and his work marked the buildings of several generations. We can go from place to place and pick it out. There is a delightful little Annunciation in alabaster in the British Museum; the head of Edward II, in Gloucester Cathedral, is in this medium; and a lovely tomb in Southwell Cathedral. Of the wooden figures very finely carved a good number remain. The best is generally considered that of Archbishop Peckham at Canterbury. Some fine bronze belonging to this period is in Westminster Abbey.

After Gothic sculpture in England came to a close, generations passed empty of gifts, and then years of destruction swept over the land. The Puritans took pride in destroying all the “images” they saw. After the

country had passed through its phase of admiration of foreign artists, like Holbein and Van Dyck, there came a group of men of varied artistry. There was Grinling Gibbons, sculptor and decorator, a most interesting figure, whose work, still existing here and there in England, recalls the spirit of the Renaissance.

His bronze statue of James II in St. James's Park is said to be one of the finest in Europe. The work of Grinling Gibbons can be seen in St. Paul's, Chatsworth, Petworth, Burghley, and at Trinity College, Oxford. After him came Thomas Banks, Joseph Nollekens, John Bacon and John Flaxman, eighteenth-century sculptors of no great merit save that they represent a period. Their work was imitative of the classic style. Flaxman had a passion for Greek sculpture, but his art is cold because behind its classicism there is nothing of the warmth and fullness of the Greek ideal. One of his best groups is the Mansfield Monument in Westminster Abbey. The simplicity that he loved is the chief merit of a number of illustrations he made for books like Church's stories of Homer, their style imitative of Greek vase-decoration.

The first Englishman whose work is powerful, and is not to be grouped in a period and valued for the sake of the period, is Alfred Stevens. He is the greatest sculptor of the nineteenth century in England, and although his work in point of time belongs to yesterday, he is one of the greatest decorators and sculptors of modern times. Stevens lived from 1818 to 1875, and in him the English school of sculpture may be said to have had its beginning. He worked in Thorwaldsen's studio in Rome, and at first seemed not to be quite sure whether he would become sculptor, painter or architect. His earliest work in England was domestic decoration, and no one thought anything of him. Then it happened that he was given the commission for the monument to the Duke of Wellington, in marble and bronze, in St. Paul's Cathedral. This is one of the finest things in England.

THE DESIGNS OF ALFRED STEVENS THAT WERE NEVER CARRIED OUT

A great deal of Stevens' power to-day lies, if one might put it this way, in the spirit of the work he was never able to carry out. His sketch for a memorial for the Great Exhibition of 1851, which was most unhappily rejected in favor of a

third-rate production, is now in South Kensington. The Tate Gallery possesses several of his sketches and cartoons. All this artist's creations should be a handbook for the art student—his designs for the decoration of the dome of St. Paul's, the British Museum Reading Room, and his wonderful sculpture designs for Dorchester House.

Two other sculptors of a certain distinction belong to Stevens' generation: John Henry Foley, the Irishman, and G. F. Watts, of whose work as a painter you have read on page 2236. Watts's bronze group of Physical Energy, built for the tomb of Cecil Rhodes and represented by a copy in Kensington Gardens, is an interesting work. His equestrian group of Hugh Lupus, Earl of Chester, at Eaton Hall, shows the same powerful spring and looseness. There is a bronze cast of his well-known Clytie in the Tate Gallery. Foley's best work—his statues of Burke, Goldsmith and Grattan—is in Dublin.

THE MAN AT THE HEAD OF ENGLISH SCULPTURE OF TO-DAY

The school of English sculpture, so ably started by Alfred Stevens, is earning a distinction in the opinions of the world to-day. It is a school that is essentially English. At the head of the men whose work is beginning to count in the story of art stands Alfred Gilbert.

There is something of the eternal creator in him. He flings his energies joyously and with abandon into whatever may be his work. There is a lilt, a rhythm, a color in his statuary that make us feel that if he had not been a sculptor he would have been a musician. Alfred Gilbert has been under the influences of Florence, Rome and Paris, but they have whispered to his art rather than dominated it.

The first work to attract the attention of the art public to this artist's work was the group of the Mother and Child. Soon after came the bronze statue of Icarus. This is a very beautiful work, fine in conception and feeling and finely carried out. There is strength as well as grace in the figure; and the wings have a magical decorative quality that subtly repeats the lines of the body. Gilbert made some excellent busts and statues—of Watts, Baron Huddleston, J. S. Clayton and others—and a number of fine memorials which give evidence of genius.

OLD AND NEW IN BRITISH SCULPTURE



A Gothic Angel, in wood,
about 1400 A.D.



The Virgin, St. Anne and St. Joachim,
in alabaster, 1400-1450.



An Apostle, in colored
alabaster, 1450-1500.



The Sluggard, by Lord
Frederick Leighton.



Peace, in bronze, by
Edward Onslow Ford.



Perseus Arming,
by Alfred Gilbert.

THE CREATIONS IN BRONZE THAT HAVE MADE THE FAME OF ALFRED GILBERT

The Fawcett Memorial in Westminster Abbey, the Howard Statue at Bedford, the Shaftesbury Memorial Fountain in Piccadilly Circus, and the Queen Victoria Monument at Winchester, and that of the Duke of Clarence at Windsor are the chief of his productions of this kind. In future times Gilbert will probably be best remembered for his Icarus, among the single figures, and among the memorials for that of the Duke of Clarence. The Queen Victoria Monument at Winchester is also a memorable piece of work; it would show to anyone that this sculptor is primarily a worker in bronze because of the dainty shapes and fantastic decorations that would be impossible in any other medium than metal.

A group of some nine or ten men—Onslow Ford, Sir Hamo Thornycroft, Alfred Drury, Sir George Frampton, Lord Leighton, Thomas Brock, Goscombe John, W. R. Colton, Bertram Mackennal and John Swan—form the main strength of the British school of sculpture. The work of some is past, of others in its maturity. There are a great many other sculptors of the past and present generation, but they have perhaps not merited a name and place among the foremost.

Sir Hamo Thornycroft had what might be called—thinking of the struggles of some artists—an easy start, for both his father and his mother were sculptors. There is a poise, a serenity in his work which sets it apart. It has all been sound and good, and some of it excellent. The Artemis and the Teucer, the memorial to Bishop Creighton in St. Paul's, the Mower and the Sower, two figures of workmen, indicate a sculptor of unusual gifts. The Teucer, which is in the Tate Gallery, deserves to be set among the best sculpture of Europe. In Homer's Iliad we have his story—the bowman who tried nine times to slay Hector. The sculptor shows the man standing, having just let fly his ninth arrow and watching it speed.

Onslow Ford's best work was in portrait sculpture, such as the statue of Irving as Hamlet in the Guildhall Gallery, the Huxley Statue in the Natural History Museum, the memorial to Shelley at Oxford, the Gordon Monument at Woolwich, and the Dr. Jowett Memorial. Portraiture has always been one of the best aspects of British sculpture, and the men of the

present day, from Leighton and Brock down to Mackennal and Colton, are worthily upholding the tradition.

Sculpture keeps our lives from being too workaday. It is a good thing to see, in public places, groups like Alfred Drury's work on the War Office, Goscombe John's Elf and The Glamour of the Rose; W. R. Colton's Image Finder; Albert Toft's Spirit of Contemplation.

EUROPE'S DEBT TO TWO SCULPTORS OF ENGLAND AND FRANCE

Amid this group of artists stands out one who was born to shape animals—John Swan. Animal sculpture is a powerful element in any art, for in it the sculptor achieves something which the shaper of human figures may strive for in vain—the expression of something truly elemental. A finely hewed group of animals, tense or springing, is the nearest we shall get to making statuary that expresses hunger and wind and rain, and spring and thunder. For all these elements lie within the animal form, and are forbidden or controlled in human beings, who are the children of civilization. In animal sculpture we not only see new shapes, but hear new sounds, new rhythms which vibrate back into our own consciousness. Europe owes a great debt to Barye in France and John Swan in England; Harry Bates, perhaps, may count too. His Hounds in Leash, for instance, is very fine.

Sculptors who have included animals in their groups have often been content to make them fierce and heroic—first a piece of marble and then an animal. John Swan seemed to build up his groups out of actual rippling muscle and bone. Those who have tried to draw animals like panthers and tigers know how difficult it is to suggest that beneath the sleek skin, which seems to efface all muscles, the flesh is folding and passing on the bones. The Leopard and Tortoise, The Puma and Mackaw, Fata Morgana, and Orpheus Charming the Beasts, are among Swan's best works.

If we take a sweeping view over the sculpture of Europe from the opening of the nineteenth century until the present hour, we shall notice a change in manner and feeling so astonishing as to leave us almost gasping.

About 1800 a revival of classic influence was at its height, with the Italian sculptor Antonio Canova (1757-1822) taking the lead in producing work that

MONUMENTAL SCULPTURES IN LONDON



A winged figure of Peace borne in a chariot—the famous Quadriga at Hyde Park Corner, by Adrian Jones.



A model for a bronze group for Australia House, London, by Sir Bertram Mackennal.
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aimed at bringing back the spirit of Phidias and the other sculptors of the Golden Age of Greece. Canova's statues have a smooth, cold grace and polished beauty, but they fall far short of the strength and power of the great examples he had chosen to follow. They have more of Bernini than of the Greek. Nevertheless, his influence reached far and lasted for a long time.

THE CLASSIC INFLUENCE IN EUROPE FOLLOWED BY NATURALISM

We have seen that in England Flaxman was the chief representative of this movement for the revival of classic simplicity in thought and style. Denmark produced another leader, Bertel Thorwaldsen, who soon took a position beside Canova. The Danish sculptor, whose birthday really fell in the year 1770, said of himself: "I was born on the eighth of March, 1797; before then I did not exist." By that he meant that his real experience of life and art began when he first went to Rome. His subjects were taken chiefly from classical story, both mythical and historical, and his results had more of the true classical feeling than did Canova's.

In Germany the movement found expression through the chisel of Johann Heinrich von Dannecker, a friend of the poet Schiller. He studied in Rome under Canova, but he balanced between classic severity and a tendency to naturalism. In his portrait busts he found especial interest in the characteristic traits of individuals. His subjects for imaginative work were at first pagan, later Christian.

The time came when taste changed, having had enough of the cold prettiness of nymphs and cupids, goddesses and heroes. Everyday human beings with their cares and toils and emotions took

the place of academic figures in the attention of the sculptor. Naturalism was set up; the academic standards were pushed aside.

We read in the preceding art chapter how Rodin, the French sculptor, turned his back on convention and represented actual humanity, whether of ancient times or his own day, as he saw and felt it. Both he and Constantin Meunier, of Belgium, may be considered more nearly related to Donatello than to any other sculptor of the past. Meunier has preserved in his statues and statuettes the life of the laboring man—the miner, the glassblower, the sower, the hammerer and others—as Millet in his paintings recorded the life of the peasant.

SOME OF THE TENDENCIES OF MODERN SCULPTURE

We are too near to the most modern thought to judge it fairly. In general its intention is to use the human form in a decorative manner and to express through it certain feelings or impressions. For inspiration it would have us go all the way back to the primitive expression of the archaic Greek period. But only a very great genius can be simple enough to use such forms without showing self-consciousness or affectation.

Of the extreme modernists we shall name but two—Ivan Mestrovic, of Jugoslavia, whose great marble figures show power and thought; and Jacob Epstein, born in New York of Russian-Polish parents, who works in England and who goes to great lengths in his rebellion against all softness and prettiness. When any of his statues or memorials is made public for the first time, a storm of criticism and protest is very sure to break forth.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 4933.



The memorial to Margaret Macdonald in Lincoln's Inn Fields, London, by Richard R. Goulden.

The Book of MEN AND WOMEN



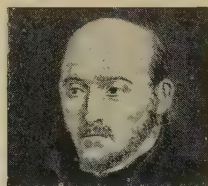
St. Francis Xavier.



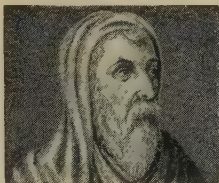
St. Dominic.



Thomas à Kempis.



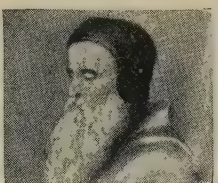
Ignatius Loyola.



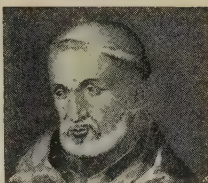
St. Athanasius.



Roger Bacon.



St. Jerome.



St. Bernard.

SOME FAMOUS MONKS

THERE has always been much discussion on the subject of monks and monasteries. A man who devotes himself entirely to a religious life and lives in a community with others similarly bound by vows of chastity, obedience and poverty, is called a monk. And the community dwelling is called a monastery. In North America there are fewer monasteries than in some other parts of the world. Over here people, speaking generally, are not inclined toward the cloister so much as are some other nations. It is not their custom to shut themselves away from the world. They prefer a more active life. The young man takes more kindly to making steam engines, or alarm clocks, or a fortune, than to cutting himself off from the world and devoting his whole life to contemplation or to the service of his order.

But the monk is a picturesque figure. He reminds a world too easily vulgar, too easily satisfied with amusements, that life carries an immense responsibility. He is one of the texts of Christ in human form: "What shall it profit a man if he gain the whole world and lose his own soul?" There is more than one way of reading this text, but the monk is at least one

CONTINUED FROM 4723



rendering of it. He reminds us that, in comparison with eternity, man's life is but a shadow.

There have been bad men in monasteries as well as saints. But chiefly, perhaps, these communities have been filled with good, quiet men to whom the struggle of life presented either a dull or a terrifying aspect. Here and there the records are lighted up by daring, defiant, or revolutionary and heroic figures. They seemed to snatch the falling time in which they lived from the flames of destruction, and valiantly to thrust the world forward on its march of progress. One monk, an Englishman, was the first voice lifted up for science after a silence of fifteen centuries.

Let us begin with the most curious of all monks—the famous Athanasius. A little man, radiant with intelligence, possessing "the face of an angel," according to Gregory, Athanasius was said to be "quick in sympathy, pleasant in conversation and still more pleasant in temper, effective alike in discourse or in action, assiduous in devotions, helpful to Christians of every class and age; a theologian with the speculative, a comforter of the afflicted, a staff of the aged, a guide of the young." At the age of thirty-three

he was called to be Bishop of Alexandria. In those days a great controversy tore the Church. The struggle became at last "the whole world against Athanasius, and Athanasius against it." Again and again he was driven from his bishopric. Again and again he returned. Once soldiers rushed in to take him at the altar. He showed no fear. This devoted son of the Church spent the periods of his exile in monasteries. During those times of quiet he wrote some memorable books. He was not a true monk, and was more a statesman than a priest. But his devotion to his ideas concerning Christ were of the most devout and sacred kind. We owe it to the monasteries in Upper Egypt that some of those ideas come down to us. Athanasius was born about 296 and died in 373. The Athanasian Creed is not now believed to be written by him. The doctrines are those he taught, but the expressions are unlike those he uses, and the best version is in Latin, whereas he wrote in Greek. Moreover, he himself makes no mention of the creed.

HOW A CHILD'S VOICE MADE A BISHOP IN A CITY CROWD

Of all the monks that ever lived, if he can properly be called a monk at all, the strangest is St. Ambrose. At the age of thirty he was so successful as a lawyer that he was made a governor, and lived in Milan. A dispute arose between two sects of the Church over the election of a bishop. There was a dispute in the Church that was almost a war. Ambrose hurried to the scene, and made an earnest and eloquent appeal to the people for Christian behavior. As he ceased speaking—so says the legend—an infant's voice suddenly cried out: "Ambrose is bishop!"

The crowd took up the shout. In vain did Ambrose protest that he was a bad man and not fit at all to be a bishop. In vain did he try to escape. The whole city insisted. And the lawyer and governor, selling his goods and putting by his robes of state, became a Christian bishop. The day came when he showed his spirit. The powerful emperor Theodosius ordered a massacre and the slaughter had been carried out. Ambrose, shocked to the soul by this bloodthirsty outrage, wrote to the emperor refusing to let him enter the church of Milan.

THE FEARLESS AMBROSE, WHO MADE AN EMPEROR DO PENANCE

The emperor replied that David had committed murder. "Imitate him in his repentance as well as his sin," answered the heroic bishop. For eight months the bishop kept the emperor at bay. Then, one day the emperor's courtiers came to Ambrose and announced that the emperor was coming. "I will hinder him from entering the vestibule," said Ambrose. "Yet, if he will play the king, I will offer him my throat." When the emperor heard this, he said: "I will go and receive the refusal which I desire." But on meeting the bishop he said: "I come to offer myself to submit to whatever you may prescribe."

Ambrose then commanded him to do public penance, and in future to let thirty days go by between the order for capital punishment and its execution. Ambrose was a just, fearless and upright man, and his writings are those of a devout and fervent worshiper of God. Born about 340, Ambrose died in 397.

A monk whose name deserves to live forever is Telemachus, the Asiatic. Leaving the quiet seclusion of his cell, he went to Rome. In the arena there he protested against the bloodthirsty combats of the gladiators. The people were furious; and stoned him to death. But his mission was accomplished. From that time—it was in the year A.D. 404—the fearful fights of men and beasts in the Colosseum came to an end.

JEROME, THE MONK WHO LOVED BOOKS AND FLED TO THE WILDERNESS

St. Jerome is interesting to us as the Latin translator of the Scriptures. He is also interesting by reason of the picture he presents to us of a man fighting what he considered a dreadful sin, namely, a love of books. Poor Jerome was a scholar. He loved old books, and he could be happy only with venerable authors full of tales of long ago. But a day came when, brought by sickness to death's door, he reflected on the next world, and came to the conclusion that pagan literature was wicked.

Before this he had been a man who loved to take part in arguments about the Church. Now he became a man who wanted to live the Christ-life. He became a hermit and lived in the wilderness. But in the wilderness he found

TWO MONKS WHO FACED GREAT DANGERS



St. Boniface, an English monk who carried Christianity to the heathen nations of Germany, braved dangers in seeking to win them for the truth. To prove that their gods were no gods, he undertook to destroy the sacred oak of Geismar, and here we see him full of zeal, chopping down the ancient tree.



St. Ambrose was a governor, and his behavior was so gentle and wise that the people insisted he should be made a bishop. For a long time he refused the honor, but finally he accepted. He refused to allow the emperor Theodosius, who had caused a cruel massacre, to enter the church at Milan.

The upper picture is reproduced by permission of Messrs. Jager & Gorgen, Munich, and the lower by permission of Franz Hanfstengl.

books in a monastery there. And soon he was among his temptations again. Again he became mixed up in violent arguments. Called to Rome to help in a dispute, he became a great favorite with ladies. And when he set out to the Holy Land, he was followed by a train of admirers. They built three nunneries and a monastery. Jerome settled down in this monastery at Bethlehem to translate the Old Testament from Hebrew into Latin. Jewish rabbis came to him by night to help him in his work.

But whenever an argument broke out in Rome, off flew Jerome eagerly. He simply could not keep himself out of a dispute. He was always spoiling for a fight. So violent was his manner that it is said that his monastery was attacked by furious enemies. To the end of his life Jerome was a scholar and a disputant. No wilderness and no monastery could ever have held this worthy man without books. He was a good man, and deserved his sainthood. Jerome was born about 340 and died in 420.

THE ENGLISH MONK WHO TOOK CHRISTIANITY TO GERMANY

It was a monk from England who, in the eighth century, carried Christianity to Germany. His name was Winfrid, and he was born probably at Kirton or Crediton, in Devonshire, the son of a West Saxon chieftain. As a boy he was sent to a monastery school in Exeter, and became an excellent scholar and a noted preacher. After some years he went to Rome. From there, under a new name, "Boniface," he was sent by the pope as a missionary to the Germans.

We get a quaint picture of the time in the scene which took place between Boniface and the heathen of Germany to decide between God and Woden. Boniface undertook to chop down their sacred oak. The heathen, thinking he would surely be struck down by their wrathful god, stood by to watch his destruction. The oak fell with a crash. Boniface did not. Whereupon the heathen embraced Christianity, and out of the oak Boniface built an oratory to St. Peter.

But alas for poor Boniface! He was not to end his days in peace. After having converted thousands to Christianity, set up monasteries, built churches, and, it is said, anointed Pippin king of France in the name of the pope, Boniface was at-

tacked by a body of pagans. He offered no resistance to their onslaught, and won the glorious crown of martyrdom. The poor old man, frail and delicate, fell before the clubs of savage robbers, and died with his relics clasped in his hand. His life was one of the most useful, hazardous and courageous ever lived by man. England may be proud of her missionary. Boniface died in 755.

ST. BERNARD, WHO DENIED HIMSELF PLEASURE AND FOOD AND FRIENDSHIP

One of the most attractive monks in history is St. Bernard of Clairvaux. He was called the "last of the fathers," so simple was he, so full of faith, so quiet of soul, so touched by the Spirit of Jesus. He was the son of a French knight, and as a boy drew others to the religious life. He became a Cistercian monk, and set himself to kill all sense of enjoyment, all desire for pleasure in his own soul. He took so little food that very often he was on the edge of fainting. When friends came he would stop his ears with flax so that he might hear no worldly talk.

Some time later we hear him saying of book-learning: "You will find something far greater in the woods than in books. Stones and trees will teach what masters do not know. Think you not you can suck honey from the tree, and oil from the flinty rock? Do not the mountains drop sweetness, the hills run with milk and honey, and the valleys stand thick with corn?"

He lived the most hard and desolate life, preaching repentance with a rare eloquence. When he was fifty-five, and worn to a shadow, he was bidden to bestir Europe for a second crusade. Pale and shrunken, he made a tour of France and Germany, preaching with a success so great that in some districts there was left scarcely one man to seven women.

HOW THE GENTLE BERNARD SAVED THE JEWS FROM DEATH

Behind this old man came a young monk stirring people up to massacre the Jews. Bernard turned back, reproached the monk as "a child of the devil," and sent him to his monastery. "Had not the tender mercy of the Lord sent priest Bernard, none of us would have survived," said a Jew. That such a tender and beautiful life of fervid piety should have been lived in the twelfth century is a glory of Christianity. St. Bernard was born in 1091 and died in 1153.

THE TENDER ARTIST-MONK OF FLORENCE



One of the best-known painters of Italy was the monk Fra Angelico, who lived for years in the same monastery in Florence as Savonarola. He painted to inspire in men feelings of reverence and devotion.



After a time the pope called Fra Angelico to Rome, where he lived a part of the last years of his life, painting pictures in the Vatican. Ruskin has said that Fra Angelico was able to express the sacred affections upon the human countenance as no one else did. Here is Fra Angelico at his devotions.

One story of St. Bernard brings us in contact with another and far different monk of that period—Peter Abélard. He is not a pretty character. Possessed of a brain that used logic as a boy uses a top, he gave himself up to disputing about the most ridiculous things in the world. He passed for a scholar of immense learning. His fame spread. He became a peacock of philosophy, a dandy of theology. He went from town to town airing his knowledge and refuting other teachers. In the height of his fame he fell in love with a girl he was engaged to teach. He married this Héloïse secretly, lest he should be stopped from advancing in the Church. Then his enemies, stirred up by his pride, came about him. He was persecuted, and had on some occasions to flee for his life. He was accused of heresy. Bernard was set to dispute with him.

We are told that, hearing the eloquence of Bernard, Abélard refused to argue and appealed to Rome. Rome condemned him. Sick of the world, he entered a monastery. His wife went into a nunnery. But his persecutions lasted almost to the day of his death. For Abélard condemned the wicked lives of the monks whose lot he shared, and these men made it hard for him. His reputation as a scholar, however, continued, but he was no longer the conceited talker seeking to dazzle and attract. He died a broken-hearted man, having spent his last years in writing rather cold and formal letters of religious instruction to his wife in the nunnery. Abélard lived from 1079 to 1142.

THE STORY OF ST. DOMINIC AND THE BLACK FRIARS

If every person that has crossed Blackfriars Bridge in London knew how it came by that name, what a multitude of people would know the story of St. Dominic! The name comes from one of the most striking figures in the Roman Church—a Spanish priest known as St. Dominic. Dominic founded an order of friars who wore black gowns and were called "black friars." He began life with a beautiful and earnest devotion to Christ. As a boy he prayed often. At the university he sold his clothes in a time of famine to feed the poor. At another time he offered to go as a slave to Morocco in place of a poor woman's brother who had been captured by the Moors. He was ordained a priest, and

soon became known for the rigor of his life and the eloquence of his preaching. So far Dominic was simply an earnest son of the Church. But a day came when he went on a mission. No sooner had he left Spain, where the people feared and obeyed the priests, than he found himself among people of a very different character. Shocked by their disobedience, their heresies and the manner of their life, Dominic set himself to reform or punish them.

Meeting a magnificent cavalcade from Rome on the same mission, he exclaimed: "How can you expect success with all this secular pomp! These men cannot be touched by words without corresponding deeds. Throw aside your splendor, and go forth as the disciples of old, barefoot, without purse or scrip, to proclaim the truth."

THE POOR MONK WHO MAY HAVE FOUNDED THE INQUISITION

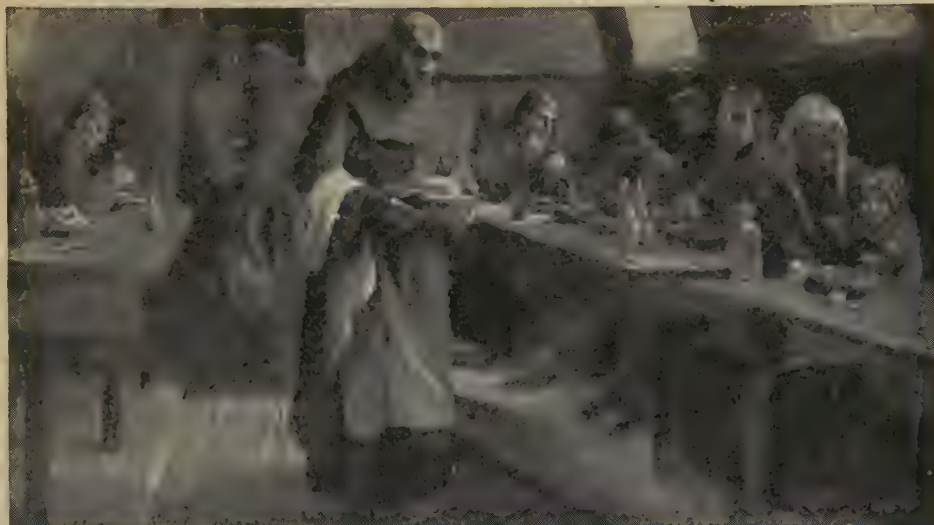
Dominic practiced what he preached. He became a barefooted, black-robed, mendicant friar—a black friar—and set out to convert these disobedient children. But, alas, success did not attend his efforts! He had to say at last: "I have spoken to you with tenderness, with prayers, with tears. But, according to the proverb of my country, where the benediction has no effect, the rod may have much. Behold how we rouse up against you princes and prelates, nations and kingdoms, and many shall perish by the sword!"

Some historians have claimed for him the terrible responsibility of having organized the Inquisition. That was the organization which tried and condemned men, women and children in the name of God. But the truth of Dominic's connection with it is doubtful. Dominic, in addition to this zeal and intemperance, was a man of great genius and much faith. He was born about 1170 and died in 1221.

ROGER BACON, THE ENGLISHMAN WHO WAS SAID TO KNOW EVERYTHING

A great scholar-monk was the English Roger Bacon—"the miracle of the age he lived in." He was said to know everything. He marks for us an interesting place in human history. For many centuries, learning in Europe had seemed to be almost dead. But toward the end of the twelfth century a desire for new knowledge awoke. By the thirteenth

SAINT BERNARD AND SAINT JEROME



ST. BERNARD'S SIMPLE LIFE AFTER AROUSING EUROPE FOR THE SECOND CRUSADE



DEATH OF ST. JEROME IN THE CHAPEL OF HIS MONASTERY AT BETHLEHEM

century men, no longer content with what had come down from the ancients, had begun to try to search into the unknown. As yet, most of the learned men were in the Church, and thus it was that one of the greatest of the pioneers of science in all Europe was a friar—an Englishman, Roger Bacon. This friar studied chemistry and astronomy. But soon his knowledge gave offense and he was imprisoned in his friary in Paris. After some time he was released at the request of the pope and was allowed to return to England. Later on he was again put under arrest, and kept in prison for the greater part of the rest of his life. Roger Bacon is said to have invented gunpowder. He lived from 1214 to 1294.

THOMAS À KEMPIS, THE LITTLE MONK WHO WROTE A FAMOUS BOOK

Early in the fifteenth century Europe was in a state of the greatest confusion. England was fighting France. The Turks were attacking Hungary. Two popes were making havoc of Church government. But at that time there lived in a poor monastery in Germany, earning bread for himself and his brother monks by copying religious books, a little man whose name was Thomas à Kempis.

That name was then quite unknown outside the monastery walls. To-day it is known in practically every language under the sun. The little monk knew nothing of the storm in the world. He did not care whether the pope at Rome or the pope at Avignon triumphed in the struggle. Such things did not seem to him of much importance. When he spoke of obedience he did not think of kings and ecclesiastical superiors. He meant the obedience of "the lower part of man's nature to the higher, and of the whole to God."

He was a deeply religious, profoundly pious man, who lived a useful and contemplative life. The noise of cannon and the shouts of kings reached his ears like the sounds of children at play. This quiet and simple little man, besides copying other people's books, wrote some of his own. One of them, *The Imitation of Christ*, he gave to the world without his name.

But so sweet, so true, so natural, so golden is this book of the little monk that it has been translated into more languages than any other book in the world except, of course, the Bible.

HOW THOMAS À KEMPIS MADE HIS NATIVE TOWN KNOWN TO THE WORLD

Little did Thomas à Kempis imagine, while he wrote, that those words of his would become the heart-literature of Europe for centuries. He had been reared in a poor cottage, the son of overworked peasants. His name of Thomas Hammerken had been changed at school to "Thomas from Kempen," Kempen being the name of the little town where his peasant mother had nursed him. This man sent the name of that humble German town round the whole earth by just writing down, again and again, that he loved God and desired immortal life! Thomas à Kempis lived from 1379 to 1471.

A very famous monk, one of the men who helped to make Florence beautiful, is mentioned on page 698 of this book. This is the painter known to all the world as Fra Angelico. In books his name is often given as Fiesole, or as Fra Angelico Fiesole. This may seem a little puzzling, but the explanation is simple. His name was Guido—we do not know his other name. When he became a monk he had to forsake his own name, and he took that of Giovanni. Giovanni is the Italian name for John. He was born at Fiesole, the little hamlet on the hill above Florence. And he was called Fra Angelico, the "angelic friar," because of his paintings of angels.

FRA ANGELICO LIVED A BEAUTIFUL LIFE AND PAINTED BEAUTIFUL PICTURES

In 1387 Fra Angelico was born. When he was twenty years of age he entered the monastery at Fiesole, to devote his life entirely to religion and painting. He painted nothing but religious subjects, and preached beautiful sermons with his brush. His first paintings were probably done at the city of Cortona, where a number of his pictures are still to be found. In 1418 he was recalled to Fiesole and labored there until 1436. Then he went down the hill into Florence, to reside in what was then the Dominican convent of St. Mark but is now a national museum.

Here he executed some of the most famous of his paintings, which are still to be seen. Some remain where he painted them; others have been removed to places more secure. Most of them have been left just as his brush finished them. Those which have been "restored," as

SAVONAROLA'S FAMOUS BONFIRE OF VANITIES IN FLORENCE



The power of Savonarola grew until it became greater than that of the rulers of Florence, and wooden galleries were set up in San Marco to hold the crowds that thronged the cathedral. Under his influence the people resolved to burn their vanities, and this picture by Mr. F. W. Topham shows the bonfire in the square.

it is called, have been spoiled. His fame spread, and he was called to do paintings at Orvieto and Fiesole.

A specimen of Fra Angelico's work at Fiesole is in the Metropolitan Museum in New York. It is a picture of the Crucifixion. After he had been nine years at Florence, Fra Angelico was summoned by the pope to Rome. The pope had heard of the painter's godly life, as well as of his work as an artist, and is said to have wished to make him archbishop of Florence.

HOW THE HUMBLE FRIAR REFUSED HONOR AND DIGNITY

The painter was as modest as he was good and skillful. He prayed the pope not to make him accept the dignity. The pope permitted him to remain a humble friar, and appointed, instead, a friend of Fra Angelico. In 1445, and again in 1455, Angelico worked in the Vatican. He died in Rome in the latter year, and there he was buried.

There never was a more beautiful life than that of Fra Angelico. He labored with all his zeal for the poor, who regarded him as a brother. He regarded his ability to paint as a gift from God. When he wished to paint he used to kneel and pray. Then he rose and did the work upon which he had set his mind. What he once painted he never altered.

Fra Angelico felt that everything he did as an artist was in answer to his prayers, and that therefore it must stand, as of too holy an origin to be touched up or improved. Religion was to him his hope and joy. He tried to lead others to share his rapture by the most beautiful paintings of heavenly beings, and by presenting, with all his tender genius, the stories of the Bible. He painted the sorrows of Jesus as well as His triumphs. These were sad days in the life of Fra Angelico, and he would weep bitterly as he painted the Crucifixion.

SAVONAROLA, THE GREAT MONK WHO MADE KINGS TREMBLE

Savonarola is one of the picturesque figures of the Middle Ages. In the midst of that gorgeous, wicked and careless period we see the shrunken figure and the gaunt face of a little hooded man. His glowing black eyes, flashing judgment and anger, glanced like lightning on the crowd from under the shadow of his cowl. He was terrible to sin. Rulers

feared him. Wicked people maligned him. The populace was swept like a sea by the tempest of his preaching. He came from his monastery to chastise the world. The world accepted the conflict. Savonarola was raised high in honor, then tried, tortured, hanged and burned. His ashes were thrown into the river.

Such, in brief, is his history. When we look more closely at this great figure we are puzzled by many things. Some people would have us believe that scarcely a greater hero ever crossed the earth. Others claim that he was perhaps the grossest impostor that ever lived. To-day men read history, not to take sides in a fight, but to see the truth of things. Savonarola appears to us now a strange mixture of nobility and delusion. We call him a hero; we cannot call him an impostor. But we can criticize him.

He seems to us, not a man who sought to deceive, but one who was himself unconsciously deceived. He believed, for instance, that evil spirits came and wrestled with him in his cell. He thought that the Holy Spirit settled on his shoulder in the form of a dove and spoke in his ear through the dove's beak. He declared that he conversed with God; he saw visions of the most frightful and appalling description.

HOW THE SEVERE LIFE OF SAVONAROLA AFFECTED HIS THOUGHT AND ACTION

All this, in our day of calm reason and medical knowledge, assures us that the hero-like soul of this good man was afflicted by the distempers of his brain. The preacher who sways a multitude needs a cool head. The severe discipline practiced by Savonarola unfitted him for meddling in politics.

But his courage was magnificent. His hatred of vice and luxury was most honest. The wickedness of the court of Rome hurt his noble soul to the quick. If ever a man felt the sharp contrast between the simplicity of Jesus and the magnificence of His Church, it was this fiery prophet of Florence.

As he passed to the gibbet on which he was burned—in sight of the beautiful cathedral where crowds had flocked to hear his preaching—a bishop said: "I separate thee from the Church militant and the Church triumphant."

"Not from the Church triumphant," replied the monk, with quiet confidence; "that is beyond your power."

THIS FLORENTINE REMAINED A MONK OF THE ROMAN CHURCH

Protestants have claimed him for a martyr. But he appears to have adored the Sacrament before his death, and to have confessed himself a true son of the Roman Church. Savonarola was born in 1452 and died in 1498.

The famous portrait by a fellow-monk, Fra Bartolommeo, gives us a fine study of the man. It was painted from life, and the original still hangs in Savonarola's cell at the monastery of San Marco in Florence.

THE SPANISH SOLDIER WHO FOUNDED THE ORDER OF JESUITS

In 1491 there was born in a Spanish castle a boy destined to become one of the most famous men that ever threw off the world to put on the monk's hood. This was Iñigo López de Recalde, known to history by his monk's name and his Roman sainthood as St. Ignatius de Loyola. He was a nobleman, and grew up on his father's estate without learning of any kind. He became a page in the court of Ferdinand, and later embraced the profession of arms. While following the calling of a soldier he was severely wounded in the right leg at the siege of Pampeluna. While he lay in his father's castle recovering himself of his wound, certain books of religion, given him to while away his time, laid a hold on his soul.

When he rose from the bed it was to journey to a church, where he hung up his soldier's arms and vowed himself to live a religious life. He removed himself to a hospital and worked in menial offices to learn humility. Then he journeyed to Jerusalem and came back inspired with the idea of founding a new religious society. He put himself to school to learn, sitting in the class with mere boys. While learning he began to influence men. Directly he stated his simple views, however, the hand of authority seized upon him and he had to flee. From city to city he went, begging his way. At last in Paris he found freedom and there he lived as a mendicant. At the university his persuasive powers drew certain young men to his side, and at the age of forty-six he was ordained and set out on his preaching mission.

His burning zeal had drawn around him a remarkable group of men. Six of them met with him in 1534 in the Church

of Montmartre and bound themselves to chastity, poverty, and obedience to their superiors. From such small beginnings, made with difficulty and against great discouragement, one of the greatest religious orders sprang.

In appearance Loyola was a striking figure. His face was thin and bore signs of the hardships he had forced himself to undergo. His olive complexion increased this effect. The high forehead, the brilliant eyes and the bald head proclaimed him a man of brain and an active student. He was naturally enthusiastic and impulsive, but his great self-control guarded him from harm through these characteristics. He loved to overcome difficulties, and in his early days always had a desire to surpass everyone else. But in his later days he came to believe that the greatest duty of man was obedience.

The miracle of Loyola lies in his creation of the Jesuits—a society spread all over the world, and working in many languages to one and the same end. For a man who was not ordained until he was nearly fifty, and who was fighting at the age of thirty, this is a most remarkable achievement. Loyola is not responsible for the political power which his society soon gathered. His influence was purely spiritual.

THE WONDERFUL POWER THAT LOYOLA HAD OVER MEN

He drew men to him by the force of his holiness. It is narrated of him that while in Paris he sought to gain the affection of a young student named Xavier, who withstood all his advances.

One day Xavier, having done well in the class for philosophy, was strutting about in great pride. Ignatius came to his ear and whispered: "What shall it profit a man if he gain the whole world and lose his own soul?" Xavier was converted, and became the famous St. Francis Xavier of the Jesuits. Such was the real power of Ignatius—a personal influence on the side of holiness. Loyola died in Rome in 1556.

The distinguishing feature of the Jesuit Order is that the members do not retire from the world and shut themselves up within the walls of a monastery: they are active in the homes of men, in preaching, teaching and writing, and in the councils of Rome. They are monks of the world.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 4959.

PLANT RELATIONS AND PLANT STRANGERS



Few who have not studied plants would think that the common white clover, or Dutch clover, seen here, belongs to the same family of plants as the pea.



European furze, so unlike both clover and pea, belongs to the same family. Nearly seven thousand different plants belong to the Pea Family.



The European daisy represents the largest of all the families of plants. There are ten thousand different plants belonging to this Composite Family, which includes the thistles, chicory and dandelion.



This is wild cabbage, which grows on cliffs in Europe. It represents the Cabbage Family, to which belong mustard, horseradish, various cresses, woad, that gave the blue dye to the Britons.



There appears to be little likeness between these flowers, and yet they belong to the same family as the rose. On the left is Alpine lady's mantle, in the middle wild cherry, and on the right stone bramble.

THE FAMILIES OF PLANTS

ONE of the chief troubles that confront us when we seek to learn to know the flowers is the very great number of distinct kinds that grow even in our own country. North of Mexico there are perhaps five thousand different wild flowers, shrubs and trees; but if we extend our study all over the world, we shall find that there are over one hundred thousand. When we find a flower in the woods or fields and want to know its name, how is it possible to pick it out of a list of five thousand? It is not an easy matter at first, but many men, called botanists, have, by their labors, made the task much less difficult than it seems to us.

They discovered first that many plants which differ widely in size and habit, in the shape of their leaves and in the color of their flowers agree in the arrangement of the parts of their flowers and the structure of their fruit.

These resemblances they regard as family likenesses, and by means of them they are able to arrange all these thousands of plants into small groups. Now, instead of hunting blindly through the descriptions of all the flowers, we have only to find by its



structure to which family it belongs, and then to search through that family

for the one that is most like the flower we have found.

In the story of Animal Life we learn that animals fall into similar groups. If, in walking through the streets, we meet with a fox terrier, an Irish terrier, a poodle, a mastiff or a staghound, we know the type of structure so well that we could tell anyone that they are all dogs. And if we go to a zoo, and see a wolf there, we know at once that it belongs to the same family. So, too, with our knowledge of cats—tabbies, black, white Persians, and so on. When we see a lion or a tiger we know that it is a cat of some kind—that is, one of the Cat Family. The same rule applies to all living things, whether animals or plants, and the discovery of these family relationships has simplified matters.

One of the first things we ought to do is to get a general idea of the chief characters that mark these families. We may, perhaps, know that our two thousand wild flowers are divided up into nearly a hundred families, and it will be a pleasant pastime to pick out

the flowers of different families in our walks.

Every boy and girl knows the beautiful wild rose, or dog-rose, that covers many hedges with its pink or white flowers in June. Each flower consists of a green ball about the size of a pea, from the top of which spread five ragged green leaves. Above these are the widely spread, broad petals of a delicate pink or white tint, which are also five in number. Spreading over the narrow ends of these petals is a ring of green pins with yellow heads, and right in the centre of this ring is a cluster of hairy threads of a greenish color.

The green ball is called the *receptacle*, and inside it are the *carpels* which contain the seed-eggs. After the flower has fallen to pieces the receptacle will grow into the red egg-shaped "hip" that makes a fine show on the hedgerows in the autumn. The ragged green leaves are the *sepals*, the five forming the calyx. The five petals, as a whole, are spoken of as the *corolla*. The yellow-headed pins are the *stamens*, and the hairy threads are the *pistils*.

THE ROSE FAMILY HAS SEVERAL BRANCHES

Now, if we were to take a flower from an apple tree, a plum tree, a cherry tree, a may tree, a blackthorn, a bramble, a mountain-ash, a strawberry, and a meadow-sweet, we should find that in spite of small differences they are all constructed on the same plan. Between the plants that bear these flowers there is little resemblance. Some are trees, some shrubs, some lowly herbs; but because their flowers are of the same type they are all included in the great Rose Family.

There are several branches of the family, known by differences in their fruit. The apple, pear, mountain-ash, and white-beam have several tough-skinned seeds, which we call pips, in a horny core, composed of five carpels, or seed-vessels, which is surrounded by firm juicy flesh. The cherry, plum and blackthorn have only one large seed in a bony stone, covered with sweet juicy pulp. In the strawberry the receptacle itself becomes pulpy and bears the seeds upon its surface; the bramble and raspberry wrap each seed in a separate globe of juice. Some of the Rose Family, like the cinquefoil, silverweed and agrimony,

have yellow flowers, and some of them are passed by as buttercups, because of their color; but if they are compared with buttercups they will be found to be quite unlike them. Here, then, among these well-known plants, flowers and herbs we may get a good idea of what is meant by a plant family.

THE POPPY FAMILY IS NOT DIFFICULT TO KNOW

The Poppy Family is a small one, and its members may easily be detected. Its flowers are always of regular shape, and have only two sepals and four petals. The sepals drop off when the crumpled petals burst out and smooth themselves. The slender stamens are very many, but they all drop with the petals as soon as the seed-eggs in the big pistil are fertilized. In the true poppies the pistil is a rounded or club-shaped knob with a sloping roof, on which the lines running from the centre to the edges are the stigmas. In the greater celandine and the horned poppy the pistil is more slender, and lengthens greatly after the petals have been shed. In the horned poppy, which we may meet with at the seashore, it grows into a curved seed-vessel a foot long. The seed-vessel of the true poppies we all know as a poppy-head.

THE BUTTERCUP FAMILY DO NOT ALL LOOK ALIKE

The Buttercup Family includes not only plants with an open cup-shaped flower, such as everybody knows a buttercup to be, but also such strange shapes as those of the larkspur and the columbine. They have five sepals, five petals, many stamens and many pistils, as a rule. Each pistil ends in a little point.

THE CROSS-BEARER FAMILY IS NUMEROUS BUT UNMISTAKABLE

The cabbage, cress, stock, mustard, radish, turnip and a host of field and wayside weeds make up the large family of Cross-bearers—so called because their four sepals and four petals are always placed crosswise. If we look at a flower of stock or wallflower we shall see what is meant; then we shall always be able to tell one of this numerous family when we meet with it.

There are only six stamens—sometimes fewer—of which two are smaller than the others, and there is only one pistil, which grows into a long slender pod, which usually splits down the sides to set free the one or two rows of seeds.

Over sixty of the wild flowers found in this country belong to this family. With few exceptions, they are not very showy, and therefore are called weeds.

**THE VIOLET FAMILY
IS TERMED IRREGULAR**

The Violet Family is quite easily recognized, since its flowers are what are termed irregular, because its petals are not all of the same size or shape. There are five sepals, five petals, five stamens and one pistil. The violet and the pansy are well known, so we can easily follow the description. One of the petals is larger than the others; this is really the upper petal, but, owing to the fact that the flower-stem always curves over, it appears to be the lowest petal. This petal is continued behind as a spur, or hollow tail, and in it the nectar is produced for the attraction of insects. Two of the five stamens have tails also, which extend back into this spur, and all of them end in flat points, which fit closely around the bent pistil. The stigma is simply a hollow ball.

**THE PINK FAMILY IS WELL
REPRESENTED IN GARDENS**

A larger family is that of the Pinks, which will be familiar to us through the pinks, carnations and sweet-william of the garden. But we have many wild flowers also that belong to this family, among them campion, catchfly, corn-cockle, stitchwort and chickweed. They all have their leaves in pairs, and often the lower ends of a pair are joined together around the stem. The flowers are always regular, the sepals and petals four or five in number, the stamens twice the number of the petals, and the pistil ending in two to five stigmas. In the pinks and campions the sepals are all joined together to form a stiff tubular calyx; in the chickweed and stitchworts they are separate. The seed-vessel is either long and cylindrical, splitting at the top into several teeth, or short and round.

**THE ST. JOHN'S-WORT FAMILY
GENERALLY HAS YELLOW FLOWERS**

We probably know the large yellow-flowered rose of Sharon that is often grown in gardens, though it is wild in some places. It is a member of the St. John's-wort Family, of which we have a dozen varieties among our wild flowers. They are mostly very upright-growing plants with slender stems and smooth

oval opposite leaves. The flowers are yellow, with five sepals, five petals, a great number of stamens arranged in separate bundles, and a pistil that ends in three or five stigmas. Some of the plants, if we hold them up to the light, will be seen to have clear little dots on the leaves, as though they had been pierced through with pins; and some have raised black dots and lines along the edges of the leaves, sepals or petals. The marsh St. John's-wort, which grows in wet places, has trailing stems and rounder soft hairy leaves.

**THE GERANIUM FAMILY HAS
SMALL FLOWERS WHEN WILD**

The Geranium Family, though it includes the large and showy geraniums of the garden and greenhouse, is, so far as our wild plants are concerned, a family with small flowers as a rule. But they are all very pretty, not only in their flowers, but also in their leaves. With the exception of the yellow balsam, or touch-me-not, they all have quite regular flowers. The herb-robert, which grows commonly on wet rocks, and the wood-sorrel, which is abundant in spring in old woods, are among the best known of this family. There are five sepals, five petals, usually ten stamens, and the pistil ends in a stout style which branches at the top into five stigmas. The plants with regular flowers have five streaks upon their petals pointing the way to the glands where the nectar is poured out. All of them have peculiar seed-vessels, so contrived that, when ripe, the seeds are shot off to a great distance from the mother plant.

**THE PEA FAMILY HAS PECULIAR
IRREGULAR FLOWERS**

The Pea Family is a very large one, and includes furze, broom, the vetches, medicks and clovers. Most of them have the leaves divided into three or more leaflets, and the flowers are always irregular and of peculiar form. The five sepals are joined together. Of the five petals, one—known as the standard—is very much larger than the others, two others are known as wings, and the two smallest form the keel.

The last two often have their edges joined together, and between them will be found the ten stamens and the long curved pistil, whose thickened portion—the *ovary*—grows into the long pod we know so well in the case of the green pea.

These pods are not always as straight as they are in the pea, the bean and the furze. In the clovers it is short; in some of the medicks it is shaped like a reaping-hook; in others coiled on itself like a snail-shell. In this family are included all the clovers and vetches, rest-harrow and beans.

THE SAXIFRAGE FAMILY GENERALLY HAS SMALL FLOWERS

Another large family, of which several members are well known to us, is the Saxifrage Family. They have small flowers, as a rule, but these are always very pretty. The four or five sepals are joined together, forming a tube-shaped calyx, from which the five petals emerge. There are from five to ten stamens and an ovary with from two to four stigmas.

The saxifrages proper are neat little plants, mostly growing on mountainsides, of which the London pride of our gardens is the best known. This is a wild plant in the west of Ireland.

In the golden saxifrages, which grow along streams and in marshes, the flowers are small and have no petals; but the sepals and leaves adjoining, being bright yellow, make the plants conspicuous.

The grass of Parnassus has a single large white flower. Between its five stamens are five broad scales fringed with knobbed hairs. The currant and gooseberry belong to this family. In the copses of the North we may find red and black currants, and the gooseberry.

THE PARSLEY FAMILY WE SHALL ALWAYS KNOW

One of the largest of our plant families is the Parsley Family; and in almost every case when we meet with one of these plants we may know at once to which family it belongs. The flowers are very small, but they are many and are arranged on slender stalks that radiate from the top of a thicker stalk.

If the wind blew our umbrella inside out and we stripped off the covering, the framework would look just like the flowering stem of one of this family—the stick being the stout stem and the ribs the slender flower-stalks.

In most cases we need a magnifying glass to make out the structure of the flowers clearly. There is a very simple calyx, sometimes having fine teeth along its rim to show that it is composed of five united sepals. There are five very tiny heart-shaped petals of white or

yellow—bluish in sea-holly—five curved stamens, and a quaint pistil with two stigmas. Some of the plants, such as hemlock and cowbane, are very poisonous; others, such as carrot, parsnip, celery, parsley, samphire and caraway, are most useful as food or for flavoring.

THE COMPOSITE FAMILY, THE LARGEST OF ALL

Largest of all these families is the Daisy Family, known as the Composite Family, because a great number of tiny stalkless flowers are packed together to form what is known as a flower-head. What we call a daisy flower is a bunch of about 250 flowers, or florets, of two forms, the outer row with a white strap-shaped corolla, and the inner one with yellow tube-like corollas. If we cut a daisy right through the middle we can see that this is so, and will understand why the family is called composite, or compound flowers. But all composite flowers are not exactly like the daisy; some, like the dandelion, the tansy and the thistle, have only tubular corollas.

In addition to the flowers named, this family includes, besides others, the asters, dog-daisy, wormwood, coltsfoot, groundsel, chicory, lettuce, sow-thistle, and goats-beard. Among well-known garden composites are the dahlia, chrysanthemum and sunflower.

THE BELLFLOWER FAMILY IS WIDELY SPREAD

There are so many plant families that it is impossible to describe them all. There is the Bellflower Family, of which the harebell, the Canterbury bell and campanula are examples.

These are herbaceous plants, with bell-shaped flowers usually of a white or blue color, though pink ones are occasionally known. The most common and best-known wild species is the "bluebell of Scotland," this delicate harebell found growing in rocky places around the globe in northern temperate regions. Then there is the Canterbury bell, cultivated in gardens for its showy bloom. These plants have milky juice, alternate leaves and scattered flowers.

THE HEATH FAMILY AND ITS MEMBERS

This family is a large one, with four well-marked subdivisions in North America. In Europe it includes heath, heather and ling. In South Africa it is abundant everywhere, and covers thou-

sands of acres, constituting indeed one of the chief forms of vegetation. In Great Britain heath, or heather, occupies great tracts of waste lands. Who indeed has not heard of the heather of the Scotch mountains and moors? It is used in some country districts to thatch houses, to make brooms and to stuff mattresses. Animals are pastured upon it, and bees extract a finely flavored honey from the flowers. Traditions of good fortune hang around its name, particularly associated with the "white heather." Among some of the family to be found in North America are the wintergreens, the Indian pipe, wild azalea, American rhododendron, mountain laurel and the beautiful trailing arbutus.

**THE PRIMROSE FAMILY MAINLY
IN THE MOUNTAINS**

The Primrose Family gets its family name of *primula*, or "first," in allusion to its early blooming. It has a salver-shaped corolla with five opposite stamens borne on a long tube. There are over a hundred species, mainly dwellers in the mountains of Europe and Asia, although five live in North America. They are beautiful low-growing plants with perennial rootstocks. They may be white, pink, purple or yellow in color. The common, or true, primrose of Europe with pale yellow flowers has three varieties—the primrose, cowslip and oxslip. Woodland floors in early spring are a vision of beauty with these radiant blooms, which have inspired the pens of many poets.

The bird's-eye primrose of North America is pale lilac in color with a yellow eye; the four-leaved loosestrife was once cultivated in the East and now has escaped from gardens. The star-flower, the scarlet pimpernel and the shooting star are odd American members of the family—very different from the yellow primroses of Europe.

**THE GENTIAN FAMILY
REMARKABLE FOR ITS COLOR**

To the Gentian Family belong the beautiful blue flowers that give the family its name. Once upon a time, says Pliny, the historian, there was a king of Illyria named Gentius who discovered the bitter virtue of the plant, which allows it to be used in medicine as a tonic. It is a large family found in the mountains and temperate regions of the northern hemisphere. It grows also in the Andes, and some forty members of it are natives of North

America. Though usually blue, the flowers are sometimes white or yellow, and in the Andes even red. The ones we know best in North America are the rose pink, the fringed gentian and the bottle gentian. The beautiful fringed gentian comes in the fall, is a lover of the sun and opens only to its rays. It rarely appears in the same place each year, as it is an annual perpetuated only by its wind-borne seeds. The blind, or bottle, gentian is of a wonderful deep intense blue. It begins to flower late in August, and northward lasts as late as October, giving the bees the last feast of the season. The Swiss Alps and the Canadian Rockies afford wonderful sheets of color in the gentians, blooming on the edge of the snows.

**THE BORAGE FAMILY
MEANS "ROUGH-HAIRED"**

The Borage Family (we should make its name rhyme with "courage") gains its name from a word meaning "rough hair" or "wool," in allusion to the roughness of the foliage of several of its members, particularly the brilliant blue borage. Other members are comfrey, bugloss, lungwort, forget-me-not and hound's tongue. Many are the legends associated with the lovely little forget-me-not, or myosotis. The commonest is that a lover, trying to gather some of these blossoms for his sweetheart, fell into a deep pool. As he sank before her he threw a bunch of the flowers at her feet crying "Forget-me-not!" It was from the forget-me-not's gold ring around its centre that botanists first discovered that the markings at the entrance of many flowers serve as pathfinders to insects.

Viper's bugloss, or snakeweed, owes its name to the time when people believed that God marked each plant with a sign that indicated its use. The spotted stem and the snake-head seeds of the bugloss seemed to show a cure for snake-bite and thus the flower was given its name.

**THE NIGHTSHADE FAMILY
NOT VERY NUMEROUS**

This family in our hemisphere and climate includes the common nightshade and the bittersweet. Its foliage is rank-scented, and its berries are narcotic, often very poisonous. In the tropics there are many nightshades, but in our climate there are but few. The familiar tomato, egg and potato plants of our gardens are members of the family, as their blossoms

noticeably point out. Many of us in the autumn have sought out bittersweet for its attractive orange-coated berries, which crack in the warmth of our rooms and display the scarlet seeds within. The bright red oval berry of the common, or woody, nightshade is more attractive than its flower. It grows in moist thickets and along fence rows.

**THE FIGWORT FAMILY INCLUDES
MANY FAMILIAR FLOWERS**

The Figwort Family is a large one, including the great mullein, yellow toad-flax, blue toad-flax, turtle-head, monkey-flower, common speedwell, American brooklime and the downy false foxglove. We all know the great torch-like stem of the great mullein growing in dry fields or on banks. Its thick velvety leaves seem encased with felt, so protected are they against the fierce sunlight of the open places where it grows. Its yellow flowers are seated around a thick long spike, often accompanied by goldfinches, with whom the seeds are a great favorite.

Yellow toad-flax, an immigrant from Europe, is rapidly spreading everywhere. Not only is its blossom spike of butter-colored flowers quite lovely, but the blue-green of its grass-like leaves is very charming. Both the yellow toad-flax and its cousin the blue toad-flax resemble the true flax before blooming. For this reason "toad," meaning "worthless," was prefixed by country people in olden days.

The white or pinkish turtle-flower, with its turtle-like head and jaws, offers quite a stiff resistance to the entrance of its "friendly enemy" the bee, therein dusting his back well with pollen to rub on the back of another flower.

**THE MINT FAMILY VERY
WIDELY DISTRIBUTED**

This is a large and well-known family, most of its members having opposite aromatic leaves whose scent comes from an oil contained in small glands. The flowers are generally clustered; they are "lipped" and much visited by bees and butterflies. Many of them are blue or purple. Some are the butterflies' favorite hue, magenta. Some are small to the point of insignificance, others showy enough for the garden.

Many species have marched across three continents, so popular are they with the insects. We should look for bugle weed, germander, false pennyroyal, skull-cap, horehound, cat mint, ground ivy,

self-heal, hemp nettle, wild bergamot, basil and thyme, and the different mints: spearmint, peppermint, water mint.

**THE ORCHIS FAMILY,
OR ORCHIDACEÆ**

This family includes about five thousand species classed into about thirty tribes. They occur both in the tropics and in colder regions. Their flowers are generally beautiful, sometimes fragrant. Often they are grotesque imitations of animal forms. They grow from short or creeping rootstocks, tubers or thickened fibres. Their leaves are undivided, often fleshy, with parallel veining. Some of us know the yellow lady's slipper or moccasin flower, which has also a pink variety as well. The small yellow lady's slipper is fragrant, and sometimes its sepals and petals are purplish. It can be found as far west as the state of Washington. The showy, or spring, orchis wears magenta. The purple-fringed orchis is heavily perfumed and needs a visitor with a long tongue to gain its warmest welcome. In inaccessible bogs lives the beautiful white-fringed orchis, together with its brilliant sister the yellow-fringed orchis.

The grass pink and *Arethusa* are northern orchids to be found in damp places. The nodding ladies' tresses is to be found the last of the season.

Why is it that Darwin and other naturalists have devoted so much study to the Orchis Family? Not merely because they are so numerous, nor so many-climbed, but because of all flowers they have adopted the most ingenious and varied devices for attracting insects. Of the six floral leaves which every kind of orchis has, one is always different from the others. Sometimes it is shaped like a pouch, sometimes like a horn. It may look like a fringed banner or a broad platform. This is the insects' "advertisement sign." Once the visitor has alighted "spring traps, adhesive plasters, and hair-triggers attached to explosive shells of pollen are among the many devices by which orchids compel insects to cross-fertilize them." Instead of living close to the ground, as so many of the northern orchids do, the orchids of the tropics climb trees to escape strangulation by the dense vegetation. Thus we have the aerial orchid, as contrasted with the terrestrial.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 4973.

FORTY WILD FLOWERS



1. Tansy. 2. Red Campion. 3. Rough Chervil (E.). 4. Cow Vetch. 5. Traveler's Joy. 6. Thistle.
7. Goose Grass. 8. Creeping Bellflower. 9. Lesser Celandine (E.). 10. Oatmint (E.).
11. Yellow Bedstraw.

Flowers marked (E.) are European and are not generally found in America.



1. Agrimony. 2. Sweet Violet (E.). 3. Water Hemlock. 4. Mouse-ear Hawkweed. 5. Honeysuckle (E.). 6. White Dead Nettle. 7. Acrid Lettuce (E.). 8. Silverweed. 9. Woundwort. 10. Creeping Cinquefoil.



1. Red Dead Nettle. 2. Bouncing Bet. 3. Hedge Mustard. 4. Motherwort. 5. Mullein. 6. Coral Root (E.). 7. Bramble. 8. Deptford Pink. 9. Scorpion Grass. 10. Creeping St. John's-wort. 11. Ivy-leaved Toadflax.



1. Dog Rose. 2. Woody Nightshade. 3. Greater Celandine. 4. Wild Cherry. 5. Germander Speedwell. 6. Evening Campion. 7. Herb Robert. 8. Primrose (E.). 9. Dog Violet (E.). 10. Hedge Parsley.



A whole fleet of canal boats tied up in Brooklyn.

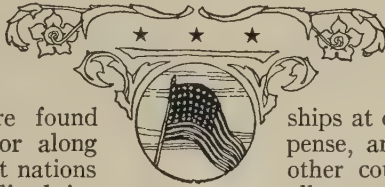
THE ERIE CANAL

BEFORE the steam engine was invented and railroads were built, cities and towns were found chiefly near the sea or along the rivers. The ancient nations that first became civilized inhabited regions about the big waters. Babylon was on the Euphrates, the Egyptians lived on the banks of the Nile, and the Greeks inhabited the islands and the shores of the Ægean Sea. England, surrounded by sea and watered by rivers, was the first country in Northern Europe to become densely populated.

The reason is simple. In those days water was the only practical means of long-distance transportation. Manufacturing, even of a primitive kind, was impossible away from the water because the manufacturers could not ship their wares to the markets. For the same reason it did not pay the farmers to raise more produce than they themselves could consume. There were a few exceptions, such as the cattle-raisers; they could drive their cattle to market over long distances. Their produce transported itself.

EARLY TRANSPORTATION BY WATER

The manufacturers and the farmers near the water could produce larger



quantities, for they could load their wares and their produce on boats or ships at comparatively little expense, and send them even to other countries. Consequently all manufacturers and farmers wanted to be near the water. It was trade that developed civilization, but it was water transportation that made trade possible.

Railroads have since changed these conditions. Without the railroads the interior of our vast country would still be wild prairie and forest. Freight cars serve on land as ships serve on the water, but water has not lost all of its old-time importance. Even to-day there are few really big cities far inland.

But at the time the American colonies had freed themselves from England, and for long afterward, there was no thought of railways. Steam had not yet been put to practical use. The population of the new United States was then confined to the Atlantic seacoast and the river valleys. Boston, New York and Philadelphia had become the most important cities, because they had protected harbors for shipping.

Meanwhile there had been some migration westward through the wilder-

ness. The regions bordering on the shores of the Great Lakes and along the many rivers feeding them consist of low, rolling country, especially adapted to the raising of grains.

MEN LOOK TO THE WEST

Very early in the history of the country there had been far-seeing men among the colonists who saw the tremendous advantages to the colonies that would follow establishing some means of transportation between the rich agricultural regions west of the Alleghenies and the Atlantic seacoast. The lands along the coast were not adapted to wheat-growing, yet the population needed wheat. With easy transportation the farmers of the West would not only be able to supply this demand, but they would also be able to export their grains to Europe. Such a route would also render the wilderness between New York and the lake country habitable, for the settlers along the way would also be able to ship their produce to market.

George Washington, practical surveyor and engineer, was one of the first to have his imagination roused by these possibilities. He had explored the country between Albany, on the Hudson, and Buffalo, on Lake Erie. Already much of this region was traversed by water routes. He became an enthusiastic advocate for connecting these waterways by canals so that boats might pass from New York to the interior. To him it was not only a question of trade. If the sturdy settlers who had cleared their little homesteads in the western wildernesses were not offered a means of communication with the states in the East, they would turn toward the power which held the Mississippi. Give them an outlet to the Atlantic coast and they would naturally maintain their allegiance to the States. To Washington and many others a waterway from the Great Lakes to the Hudson was necessary to develop a great united nation.

Possibly it was only those of big, broad minds who saw it from this point of view. More numerous were the merchants and tradesmen of New York, who, for more selfish reasons, agitated the idea with much energy. They feared the commercial rivalry of Boston and Philadelphia. With western grain exported to Europe passing through New York, that city would become the great trade centre of the country, its most important seaport.

They finally compelled the state legislature to take action.

FIRST DISCUSSION OF A GREAT CANAL

In 1791 the legislature had ordered a survey made. Engineers were sent to study the country between Albany and Lake Erie and report on the possibility of digging a through waterway between those two points. Their report was warmly in favor of the undertaking. And so the first actual step was taken toward the digging of the Erie Canal.

Travelers of that period have left interesting records of the difficulties to be encountered on the way. From New York City they journeyed from two to five days on sailing boats up to Albany, thence overland seventeen miles to Schenectady. Here they embarked again on boats, propelled by oars and sail, and sometimes, over shallow stretches, by means of poles. After traveling 104 miles in this fashion, at the rate of about twenty miles a day, they would reach Utica, a small, log-hut settlement. Another nine days' journey by water and land brought them to Oswego, on Lake Ontario. Naturally very little merchandise was sent over this route, but such as was sent cost \$100 a ton, or more, for freight.

PPRIVATE INDIVIDUALS FAIL TO DIG A CANAL

At first the state attempted to encourage private companies to undertake the vast work of cutting through the waterway. Some were organized and even began work; short sections of canal were dug, connecting some of the various rivers and lakes on the way. But in those days there were few rich men, and it was found impossible to raise enough capital to finance the whole undertaking.

One of the most enthusiastic advocates of the scheme was Gouverneur Morris, then representing New York in the United States Senate. "Some day," said he, "ships will sail from London bound for Buffalo, via the Hudson River." It was he who interested De Witt Clinton in the idea, the man whose determination and energy were yet to bring it to a complete realization.

It was nearly twenty years after the first survey had been made that the state again took action. By this time it was obvious that the private companies could not accomplish much. So in 1810 the legislature appointed a canal com-

OLD DAYS AND NEW ON THE ERIE CANAL



Before railroads became common many passenger boats were built for the Erie Canal and were very popular. This picture, made from a water-color of the time, shows the boats drawn by three horses going smoothly at the rate of four or five miles an hour, while the passengers talked, read or looked at the scenery. Rather uncomfortable sleeping quarters were below.



Flourishing cities grew up along the canal, and in places it is now bordered by high buildings and busy streets. Here we see a double lock on the canal in the heart of the city of Oswego. Progress is necessarily slow, as bridges bar the way and must swing aside or rise to allow the boats to pass. Many little towns along the canal added "port" to their names because of their location.

mission to go to Washington and lay the matter before the president and Congress. As George Washington had already said years before, an Erie Canal was of great national importance: it would unite the nation—the East with what was then the West. The cost had been estimated at \$5,000,000. Private capitalists could not subscribe such an amount, but surely Congress could appropriate such a sum for a work of such importance.

DE WITT CLINTON AND THE ERIE CANAL

But in those days Congress did not make \$5,000,000 appropriations so readily as it does now. There was much discussion and powerful opposition. Then came the War of 1812 and the Federal Government had other matters to which it must devote its energy and funds. It was then that De Witt Clinton began publicly to agitate the digging of the canal. And finally, in 1816, the governor of New York appointed a new canal commission authorized to raise a loan which would be guaranteed by the state. At the head of this commission the governor placed De Witt Clinton.

To test the interest of the people of the state in the canal scheme Clinton made it a political issue; in the following year, 1817, he became a candidate for governor, promising that if he were chosen he would make the digging of the canal his chief business. He was elected by one of the biggest majorities that ever put an official into office. On July 1 he was inaugurated. Three days later, on Independence Day, he went up to Rome, on the Mohawk River, attended by his staff, and began the digging of the canal by turning up the first shovelful of earth.

According to the plans, the canal was to be 40 feet wide at the top, 28 feet at the bottom and 4 feet deep. The cost would be about \$5,000,000. It was the size of the work that was most remarkable; as a feat of engineering skill it was then unusual, but, compared with the great works that are undertaken in the present time, it was not especially difficult.

Yet there were many supposedly well educated people in those days who thought the Erie Canal a wild dream. "You cannot make water run uphill," they said, though the theory of locks, by means of which barges could be lifted to higher levels, had already been put into practice in canals abroad. The digging

began. In two years a section fifteen miles in length was finished, connecting Rome with Utica. The next year the canal reached the Seneca River.

WHEN THE CANAL WAS FINALLY COMPLETED

De Witt Clinton had said that the work would be completed in 1823, but this promise was not fulfilled. It went more slowly than had been expected. His political enemies made the most of this in the next gubernatorial campaign. In spite of this he had been re-elected to a second term, but by a very slender majority. Plainly the people were growing discouraged with the slow progress of the canal work. At the next election, in 1822, Clinton had not even been nominated as a candidate. His opponents came into office, though he remained the head of the canal commission. And then the governor removed him from that office, which he had held since 1810, even while governor. His enemies, those who had been against the canal from the beginning, a political ring known as the "Albany Regency," seemed to have triumphed. After this humiliation it was thought that Clinton's public career was ended.

But the man who had transformed talk into action was not to be overcome so easily. Under the Albany Regency the work on the canal almost came to a standstill. This caused even more dissatisfaction than the slow progress. So two years later, in 1824, Clinton found himself with enough friends to be nominated as candidate for governor once more. And when the election came around he was again put into office by a great majority. Once more in office and at the head of his old canal commission, he began pushing the work with renewed energy. And a year later, October 26, 1825, the work was completed and the opening ceremony was celebrated.

CEREMONIES WHEN THE CANAL WAS COMPLETED

The first boat to enter the canal at Buffalo was the Seneca Chief, a luxurious passenger packet. On board were Governor Clinton, his family, his friends and his official staff. A team of four powerful gray horses hauled it along, and as they began treading the towpath a cannon at the entrance of the canal announced the official opening. A minute later another cannon boomed forth, some miles away;

THE GREAT LOCKS OF THE ERIE CANAL AT LOCKPORT



While these locks are not so large as those of the Panama Canal, they are still unusually interesting. They are in the little city of Lockport, in western New York, where the land descends toward the level of Lake Erie. These, however, are not the largest on the canal. At Little Falls is the highest lock in the world, and at Waterford is a set of five, which together raise or lower the boats the immense distance of 184 feet. The total lift of the Panama locks is not half so much. There are 57 locks all told, and the majority have a lift of from 16 to 20 feet. They have a maximum inside width of 45 feet, a length of 306 feet and a depth of 12 feet of water over the sills.

Photo, Kadel & Herbert.

then a third, far off in the distance, almost beyond hearing.

These cannons were the first of a series of several hundred cannons stationed at intervals along the canal, reaching down along the Hudson to New York, each barely within sound of the other. And so the news of the opening was flashed down to New York as fast as sound could travel, passing down the line in one hour and twenty minutes.

Following the Seneca Chief into the canal came a procession of barges, each gaily decorated with flags and flowers, crowded with people. One, called Noah's Ark, carried as passengers a bear, two fawns, two eagles, two raccoons and two Indians. And so the procession continued along the canal toward Albany. All along the route it was met with music and cheering crowds of farmers, most of whom had settled in anticipation of the benefits they would derive from the canal.

At Albany the barges were greeted with the booming of cannon, a grand military procession and a citizens' parade. Here the flotilla of barges glided into the Hudson and began its journey down the river to New York. The Washington, a new steamer, one of the first afloat on the Hudson, came up to meet them. "Where are you from and whither bound?" it signaled. "From Lake Erie, bound for Sandy Hook," replied the Seneca Chief.

The Washington and the Seneca Chief leading, the procession continued, passed New York to the sound of ringing bells and booming cannon, and continued down the harbor toward the Narrows. The journey from Buffalo had taken just nine days.

THE WATERS OF LAKE ERIE MINGLE WITH THE OCEAN

Outside the Narrows the flotilla paused. Then the governor lifted a keg containing water from Lake Erie which he poured into the Atlantic Ocean, to signify the union of the two waters. Another keg, containing a mixture of waters from all the great rivers of the world—from the Ganges, the Thames, the Nile, the Amazon—was also poured over, to indicate that the commerce from all parts of the world would now pass that way. As the governor pronounced the official address tears streamed from his eyes. For twenty years he had talked and worked for the canal, at times apparently on the verge of failure. Now he had triumphed.

The celebration that welcomed the governor and his companions in New York City exceeded anything of the kind that had ever taken place before. Military and citizens' parades thronged the streets. All the trades were represented, the fire department leading. Heading the marching printers was a wagon carrying a printing-press. And as the procession marched the press turned out leaflets bearing the printed verse:

'Tis done! 'Tis done! The mighty chain
Which joins bright Erie to the Main,
For ages shall perpetuate
The glories of our native state.

The Erie Canal more than realized the expectations of those who had advocated its construction years before. Even as a mere business enterprise it proved a success from the beginning. In 1825, the year in which the work was completed, the tolls collected along the finished part of the route amounted to over half a million dollars. Five years later, in 1830, the state collected \$1,000,000 in tolls. By the end of 1837, only twelve years after it had been opened, the Erie Canal had paid \$15,000,000 into the treasury, which was more than the cost of digging and maintaining it in repair combined.

WHAT THE CANAL DID FOR NEW YORK CITY

For the business interests of New York it had done even more. In 1824, the year before traffic was opened along the whole canal, it cost \$88 to send a ton of freight from Buffalo to Albany. Eleven years later, in 1835, it cost only \$3. This meant that the people of New York and those along the coast would get their bread so much cheaper. It also enabled the poor people of Europe to get their bread cheaper, for now vast quantities of wheat were shipped down the canal and exported to Europe. Over half of all the wheat exported from America to Europe came by this route. It was the Erie Canal that made New York the biggest business centre on the Atlantic coast, the most important seaport in the country.

HOW THE CANAL HELPED THE STATE

With a navigable waterway traversing it, it was only natural that New York State should develop. What was once a wilderness, through which the early settlers had passed to reach the Great Lakes region, now became covered with prosperous farming communities. Even before

THE LOCK SYSTEM AT LITTLE FALLS, N. Y.



Our picture shows part of the series of locks at Little Falls, New York. All the locks are built of concrete and operated by electricity. They are filled with water and emptied by means of culverts, one in each of the side walls opening into the lock chamber through 20 ports.



This lock has a lift of $40\frac{1}{2}$ feet. This is remarkable because it has a greater lift than any lock on the Panama Canal. The lock gates are massive steel doors swinging on pivots. Some of the gates weigh over 200,000 pounds each. A pair of gates may be opened or closed in about 30 seconds. Photos, Ewing Galloway.

the canal was completed the immigrants had arrived to lay out their homesteads, in anticipation of the produce they would be able to raise for the New York, Boston and Philadelphia markets.

Already while the canal was being dug there was talk of wagons that should run on iron rails, drawn by steam engines, and in 1831 a railroad was actually built from Albany to Schenectady, a distance of seventeen miles. Ten years later the railroad had been extended to Buffalo. But the railroads did not have any great effect on the traffic on the canal. For the reason that it costs so much to build and maintain railroads and freight cars, water transportation is, and always will be, cheaper.

THE CANAL WAS WIDENED AND DEEPEINED

It is usually said that the Erie Canal was completed in 1825. But that is not quite true. It is not yet completed. Within ten years there was more freight than the canal barges could handle. Branches reaching out into other districts were continually being dug, until there were over a thousand miles of canal. Then the main canal was widened to 70 feet, so that barges large enough to carry eight thousand bushels of wheat instead of only one thousand bushels could pass.

It was not long before the railroad companies began to show a bitter opposition toward the canal. Naturally the canal forced them to keep down their freight rates. In every way they could they tried to impede any improvements on what they called the "ditch." Through their efforts a law was passed abolishing tolls. Apparently this would make freight rates cheaper on the canal. And so it did. But it also abolished the source of revenue from which improvements could be made. This obliged the legislature to appropriate special sums of money for the purpose. And this again raised a strong sentiment against the canal among those who did not benefit directly from it and felt they were being taxed for the good of those who lived along its route. The consequence was that the canal was neglected.

AGAIN THE CANAL WAS IMPROVED AT GREAT EXPENSE

But finally, in 1903, the people awoke to the realization that the railroads were opposed to the canal only for reasons of self-interest. And then amends were made for the many years of neglect. The

people voted in favor of spending over \$100,000,000 to build what may be said to be a new canal, but a modern one, along which steamers may sail as they do up and down the Hudson. The cost to the state turned out to be double what had been voted. The new canal follows, for the most part, the line of the old, but many miles have been relocated for several different reasons. Great and costly though the changes were, the canal did not regain its former importance.

The system of locks along the new Erie Canal, or the New York State Barge Canal, as it is now generally called, surpasses even the Panama locks. In a dry, sloping pasture behind the little town of Waterford the engineers have built what looks like a flight of giant steps—huge concrete blocks, in each of which is one of five locks. Combined they will lift the freight steamers 184 feet, more than twice as high as the Panama locks. At Little Falls, where the new channel of the canal ascends a narrow ravine, there is one lock, the highest in the world, which will lift the steamers over forty feet in eight minutes, as though they were being hoisted by a giant derrick. There are fifty-seven locks in all.

SOME WONDERFUL FEATURES OF THE WORK

Another wonderful feature is the great movable dams, big steel girders and steel plates riveted together, which are hinged on gigantic bridge-like structures. When navigation ceases in the winter these dams are swung up so that the ice floes may sweep down unimpeded. There are eight of these great dams, and each cost \$800,000.

The barges which take the place of the old horse-hauled craft are of 2,000- to 3,000-ton burden, compared to the 250-ton burden of the old barges. Some are able to carry the contents of a freight train of seventy-five cars. That is the size of an average ocean-going freight steamer. And being propelled by their own power, these modern freight-carriers are able to carry their cargoes from Buffalo to New York two and a half times faster than did the old barges.

A fleet of six barges, one being a power boat, can be passed through a lock at one time. Larger barges are used for special purposes. There are now no tow-paths on the canal, so all barges are drawn by power boats.

